A Haymarket publication

June 1985 95p

MSX COMPUTING

Grafpad — a touch of magic

Testing — an MSX-compatible printer

Interactive video — a taste of things to come

PLUS 25 pages of software news, reviews and listings

COMPETITION
10 data recorders to be won

If all MSX Computers are the same how is Sony's Hitbit different?

MSX is a worldwide computer standard, chosen by most of the world's largest electronics companies. With MSX machines, all software and all hardware is completely compatible... games, educational and business programs as well as disks, joysticks and printers, which means you can borrow your friends' MSX software and play it on your machine, and because it's an agreed standard, it will be here for years to come. Obsolete? Not with MSX.

Like other MSX manufacturers our Hitbit 75 has the best 'basic' around, great colour, great sound, a 64k memory and more ports than you'll probably ever need.

Hitbit also has a disk drive, printer, data cartridge and a remote control joystick. But, who else offers free, a unique personal data base that can store addresses, schedules or even remind you when to feed the cat?

Who else offers our superb Sony styling?

Who else enjoys such a reputation for reliability? Only the Sony Hitbit, the logical choice in computers. SONY.

MSX COMPUTING

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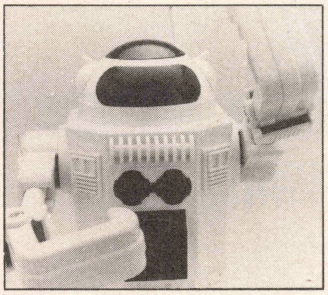

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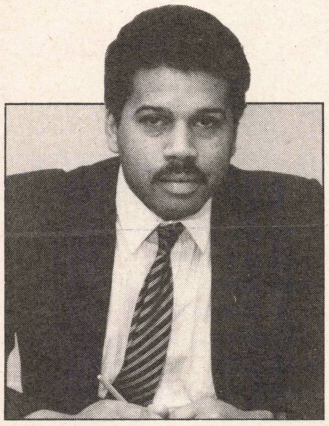

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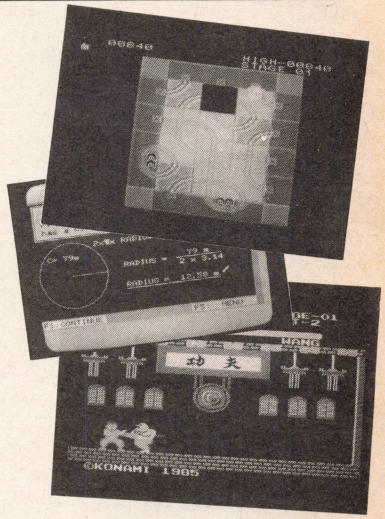
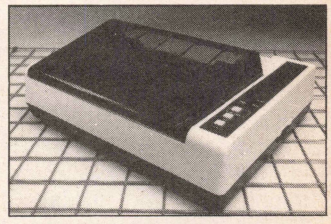


TESTING

20 THE RIGHT TYPE. *At last, an MSX compatible printer. Made by Hudson and distributed by Microlink, it's fast, efficient and should bring relief to all those tearing their hair out trying to print MSX graphics characters*



LISTINGS

62 *Now it's time to take it out on your keyboard. Here's a dozen pages of listings to keep you and your machine busy for weeks. All you have to do is flex those fingers*

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Activision converts Ghostbusters to MSX

Following our news back at the beginning of the year that software house Activision had snapped up *Ghostbusters*, we can now tell you that it has been converted to MSX and should be in the shops in the next few weeks.

In case you were one of the few people who didn't get round to seeing the film last Christmas, the game involves you setting up a 'Ghostbusters' franchise, equipping your outfit, catching ghosts and stopping Marshmallow Man.

'I ain't 'fraid of no ghost!'

Having seen the excellent Commodore version, we are a little disappointed with the conversion — the music isn't quite so catchy and there isn't any speech synthesis . . . 'He slimed me!' for instance is conspicuous by its absence.

Rectified

But as we have what Activision calls a 'technical sample', rather than a finished product, this omission may be rectified on the final version that goes on sale.

Nevertheless, the game is still great fun to play, and you'll no doubt find yourself singing along with the theme tune just like us.

We'll be giving *Ghostbusters* a full review next month, so in the meantime, 'Who ya gonna call . . .?!'

WIN A SAFARI TO KENYA WITH YOUR NEXT PURCHASE OF ELEPHANT DISKS.
Just complete the puzzle card
ELEPHANT PUZZLE
ELEPHANT PUZZLE

Want to go on safari?

Fancy going on a safari in darkest Africa? If the answer is yes, then you'd better nip down to your local computer dealer, buy some Elephant floppy disks and enter its safari competition.

To qualify all you have to do is buy a 10-disk pack, complete the enclosed puzzle and write an apt and witty slogan.

All applicants will receive a free Elephant 'T'-shirt. The competition closes on June 30th so if you want to enter then you'd better hurry!

For further details contact: John Wise, Dennison Manufacturing Company, Colonial Way, Watford, Herts. Tel: (0923) 41244.

Make a day of it in Sutton

If you're within hacking distance of Sutton, in Surrey, you might like to know about a forthcoming Computer Day.

This has been organised by the Sutton Library Computer Club on behalf of the Association of London Computer Clubs, and is to be held in the Sutton Central Library on Saturday 11th May.

The morning will consist of a computertown type event where people will be encouraged to try out a variety of micros, with advice and help from club members.

The afternoon will concentrate on 'useful' computing, giving people hands-on experience of word processing, databases, spreadsheets and communications.

The entrance fee is 50p for the morning and £1 for the afternoon. Further details from Jennifer Woeller (01-661 5031) or David Wilkins (01-642 3102.

New cartridge technology for MSX — GST Software gets smart

Just as we've got used to the wonders of cartridges, technology takes another leap forwards. In the very near future you'll be seeing credit card-sized carts, carrying anything up to 128K of memory, at previously impossible prices.

The product that achieves all this is commonly known as the smart card. But the first one you're likely to see, made by Astar International in Japan, is called the Astron Card.

Rather than using chips plugged into a printed circuit board, smart cards have the circuits printed directly onto the wafer-thin board.

GST Software, and its MSX-devoted offspring Electric Software, will be handling the smart card development in the UK and Europe. The company has already succeeded in creating interest among major software houses, whose support the system needs if it is to take off.

Activision and Konami are already interested and other companies are in the process of assessing the system's potential.

MSX should be the first home computer system to make use of these cards, with versions for Commodore and Sinclair machines following along behind.

To use the card with your MSX micro you'll need an adapter, which looks like the standard cartridge. The smart card plugs into the top of this.

These connectors should initially sell for around £5 — but, of course, you only need one. The cards containing the software plug into the connector, and GST hopes to have the cost of these down to about £10 by Christmas. This will make the cards competitive with cassette based software.

Mike Hall from GST told us that the company has placed a 'six figure exploratory order', but he thinks that it will be at least a couple of months before the product starts hitting the shelves.

A lot depends on support from the companies, but smart cards have applications outside of the games market.

Cult game comes to UK

Boulderdash, a consistent number one best seller in the United States, is being converted to MSX by Orpheus Software. It is an arcade game that has become a cult in the US but so far has only been available for Commodore 64 and Spectrum micros. Orpheus claims that the MSX version will be as good, if not better than the Commodore version, and it will run on 32K machines.

Orpheus is also bringing out an MSX version of *Elidon*, a graphic arcade adventure based on fairy mythology. Soon to be seen for the Commodore, it looks set to be a major hit.

So get your diaries out and pencil in autumn for the MSX version.

New recruits to the MSX working party

After months of negotiations Pioneer has signed the dotted line and joined the MSX working party.

Jeffrey Pflaumer, Pioneer's sales and marketing manager, says the company joined on May 1st and hinted that its 64K MSX micro known as the PX-7 will be launched 'sometime in July or August'. The price is expected to be around the £300 mark.

We've also heard rumours that Panasonic is joining the working party too. A company spokesman admitted that 'the matter is under consideration', and Graylings, who represents the other members, confirms that talks have taken place.

Three more Electric titles

Hot on the heels of *The Wreck, Le Mans* and *Buck Rogers* come three more titles from one of the most prolific software houses, Electric Software.

All the games are scheduled for release in July and the first title, called *Barnstormer* revolves around Barnie, the pilot of a bi-plane.

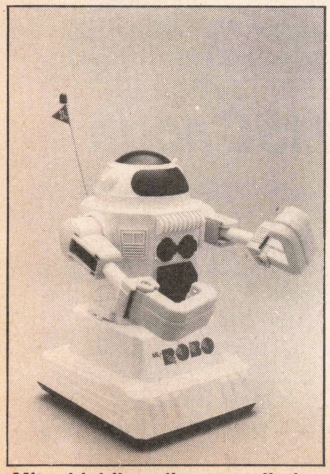
Pinkie is the second title and it's based, strangely, on the antics of a pink elephant on a roller coaster!

Mike Hall, Electric's marketing manager describes the third game as a 'tongue-in-cheek adventure depicting Romeo and Juliet and Cupid, complete with bow and arrow'. We can't wait to see it!

Initially the games will only be available on cassette but cartridge versions are planned later in the year.

Although prices have yet to be finalised, a £7.95 price tag looks likely.

Get your robot here — and save yourself some money



Mitsubishi's radio-controlled robot

ROBO made a lot of friends when he/she appeared in our April issue. In case you're wondering who or what ROBO is, it's the radio-controlled robot produced by Mitsubishi, intended mainly for use as a promotional gimmick.

But there's good news for people who want to get hold of one. As part of a general Mitsubishi promotion, Tavistock Hi-Fi is selling limited quantities of the robot. At £59.95 it's not cheap, although the recommended price is £80!

If you want your own movable MSX friend contact Tavistock on (0234) 56323.

Accompany your micro with new software from Rittor

If your micro asks you to accompany it, that doesn't mean it's just joined the Police Force. It's probably just running some new software from Rittor Music.

We've already reviewed the company's *PSG Musiwriter* — a cartridge based music composer selling at around £20. Now this has been followed by *FM Musiwriter*, specifically designed to make the most of the sound facilities of the Yamaha CX-5M.

For just a few pounds more you have access to a lot more instruments. And, of course, you have the advantage of the Yamaha's special FM sound synthesis and versatile sound outputs.

The company is also marketing *Odyssey K*, a cassette based music program for all MSX machines. It turns the computer keyboard into a music keyboard, and allows you to compose and play on three channels. There is a fair amount of control over pitch, volume and envelope, and the notes are displayed on the screen.

The program should be available in a few weeks time, and will cost around £12. For more details of all three products, contact: Rittor Music, 24 Broomgrove Gardens, Edgware, Middlesex.
Telephone: 01-952 5302.

First MSX user group starts up

After months of patient waiting, MSX computer users can now join their own MSX user group.

Andrew Phillips has recently started the group in Ormskirk and says, 'We believe that the MSX micro deserves the support of a dedicated user group'.

Once the group has acquired more members it plans to offer a variety of services including a regular newsletter.

So if you want to get together with fellow enthusiasts, swop ideas or just make friends, then send a large stamped addressed envelope to:

Andrew Phillips,
MSX User Group,
Room 5,
14 Moor Street,
Ormskirk, Lancs.

Four golds for Britain

US Gold is launching four new conversions for MSX at the end of June. The games include *Grogs Revenge, Whirly Nurds, Bounty Bob Strikes Back* and *Dam Busters.* They are expected to retail at around £8.95.

At the moment US Gold is in dispute with GB Gold, a software house set up by Preston-based distributors Vanguard Leisure.

The two companies not only share similar names but have almost identical logos. A court case is in the offing to settle the dispute.

If you're on a tight budget

If you're on a tight budget and can't spend too much money on games, then Ranjan Software may have solved your problems.

The company has just launched a cassette packed with 10 games for MSX micros costing only £7.95.

Known as *Bonanza,* the collection includes role playing and arcade games, and sounds like a good buy.

Further details can be obtained from Ranjan, 3 Wensley Close, Harpenden, Hertfordshire. Tel: (05827) 69152.

JVC grand opening

You've heard people talk about MSX being the centre of a home entertainment system. Now JVC has started pushing this idea by making its MSX micro one of the main features in its new Audio, Video and Computer (AVC) Centre in London.

The centre is in a highly salubrious area, being located at 82 Piccadilly. JVC has had a Video Information Centre there for five years. But with home entertainment systems becoming more integrated it made sense to include the company's other lines.

Apparently, the opening of the centre 'signifies the dawn of a new era within the world of consumer electronics' (it says hers). Well, a press launch wouldn't be complete without at least one era dawning. But the centre certainly is interesting.

As well as being able to see all the JVC products in action, you can also avail yourself of the centre's video faciities, including multiple VHS copying, editing and telecine services.

The centre will also continue to run its video production courses.

David 'Kid' Jensen at the launch of JVC's AVC

Cutting the ribbon at JVC's grand AVC launch in Piccadilly

Tax on blank tapes

If the government gets its way, computer users could find themselves paying a 10 per cent tax on blank cassette tapes.

The levy is aimed at helping the recording industry make up its loss of revenue as a result of record piracy.

This move seems grossly unfair on people who use blank cassettes for data storage rather than taping their Boy George albums.

However the good news is that a body called the Tape Manufacturers Group, which consists of companies like Agfa, Panasonic and Sony, is vigorously campaigning against such a move.

Blackett Ditchburn, one of TMG's representatives, says, 'The government wants to enforce the levy to cover the infringement of copyrights, but what about people who use photocopiers who also infringe the copyright of authors?'.

The proposals for the levy are still at the Green Paper stage, which means they're still under consideration. But if the government goes ahead with its proposals the tax could become law later this year.

MSC north

Scottish readers of *MSX Computing* can look forward to a second series of Grampian Television's computer series *Bits 'n' Pieces.*

This latest series is concentrating on software for the BBC, Amstrad, Atari, Commodore 64 and MSX.

Aimed at viewers new to computing the programme will be broadcast to the Grampian region during the summer.

Low-cost graphics packages

If you need help with your graphics, but feel that a graphics tablet or light pen is going a bit too far, Cable Software has two new programs that could be ideal.

Both titles are appearing under the Electric Studio label. *Sprite Editor* makes creating sprites very easy, even with a joystick! Up to 64 sprites can be designed and stored, and can then be recalled by other programs.

Graphic Designer is a somewhat more complex program for creating pictures on screen. It employs ikon-type menus for easy use, and has an impressive list of features, including various types of automatic pattern drawing.

Both programs are compatible with the Sanyo light pen unit. *Sprite Editor* will cost £7.95 and *Graphic Designer* retails at £14.95.

Correction

In last month's review of *Zaxxon* we included Philips' telephone number by mistake.

The game is distributed exclusively by Electric Software in the UK, and the telephone number to ring for details is: (0954) 81991.

Major distributor goes into the red

Many software and hardware companies are having a hard time keeping their heads above water in the current economic climate, and the home computer distributor Spectrum is no exception.

In April the company, which sells Goldstar and Sanyo MSX micros as well as small business machines, went into the red.

One of the company's buyers, who declined to be named, says the problems are due to a 'high level of faulty products being returned, and the way they are being manufactured'.

None of the MSX manufacturers we talked to had any problems with their goods being returned and Keith Newman, Spectravideo's managing director, stressed that Spectrum was a good customer.

At the time of going to press, Spectrum's managing director Alan Warren wasn't available for comment, but a spokesman said that most of the returns were on Commodore and Sinclair machines.

Estimating the problem

If you're having problems grasping mathematical concepts than ASK's educational game *Estimator Racer* could be just the ticket.

ASK has taken the view that education needn't be boring and has set the program around a motor racing track.

The idea is to solve a problem at the bottom of the screen and the answer is the lane you are to race in.

Each time the correct answer is worked out your speed increases and you can build up faster lap times.

To make the game more realistic ASK has even added some oil slicks.

The game is likely to be aimed at 5-14 year olds for around £8.95, and will be available in July.

Triton takes a bow

The Triton is the latest micro to join the ranks of MSX.

Manufactured by a British company, Radofin Electronics, the machine is a standard 64K micro with CP/M compatibility and is expected to cost around the £200 mark.

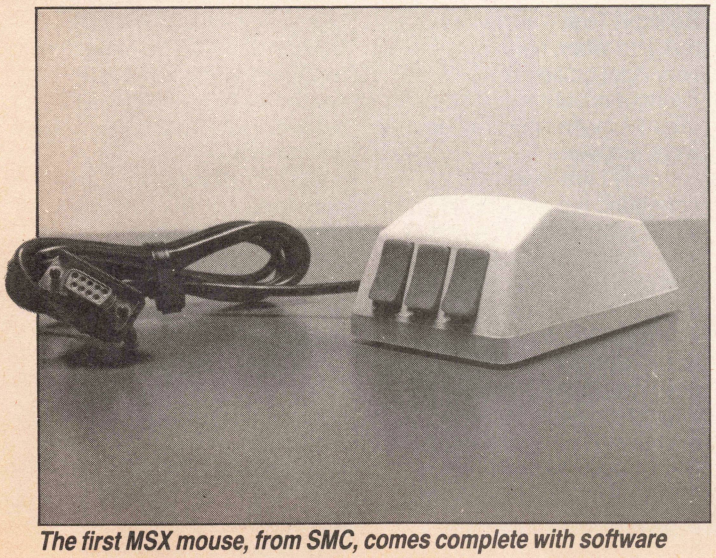
Mike Quelch, Radofin's sales director, says, 'We built the machine in our Hong Kong factory and have taken on the Spanish company Eurohard (who has recently taken over Dragon Data) to handle the marketing for us'.

The machine weighs only 2.7kg and comes in a sleek cream finish, with 72 keys, the normal cartridge and cassette ports, and composite video and RGB outputs. As an optional extra Radofin also plans to launch an 8K monitor ROM.

At the time of going to press a dealer network has not been set up, but Mike Quelch anticipates that the Triton could be on sale by June.

Radofin also expects to launch a 2.8inch Quick Disk to complement its micro, but as yet no details are available.

MSX mouse on its way courtesy of SMC



The first MSX mouse, from SMC, comes complete with software

A mouse for MSX is being developed by SMC Supplies which will hit the high streets in July.

Costing £59.95, the mouse will come complete with software which offers extensive facilities. These include various brush shapes, triangles, circles, box fills, variable size text, a save and reload to/from either tape or disk, and a fast screen dump.

A sprite designer and a character designer will also be included. The software is 100 per cent machine code and the mouse system will be available through most high street computer shops and independent retailers.

LETTERS

Sprite hitch

I am having problems in running 'Sprite Designer' by Graham Bland, printed in the December issue. The 8 × 8 part runs well. The problem is that when in the 16 × 16 mode I run out of string space in line 1150 or 1290. Not only have I spent hours pouring over this problem, but I have also retyped the whole program three times. Can you help me out please?
John Brody
East Sussex

Graham Bland replies:
The problem is due to a regrettable oversight on my part. MSX BASIC allocates enough memory for 200 characters by default. This is more than adequate for the 8 × 8 sprites.

This string space must be increased for 33 × 33 sprites. The remedy is to alter line 110 to read:
110 CLEAR 600.
Sprite definitions for 32 × 32 sprites should now run without a hitch.

North of Watford

I feel I must put pen to paper over a matter of some importance to us poor MSX users up here in the 'Wild Midlands'. You would think north of Watford was the other side of the world.

I have had my Toshiba HX10 since November 1984. Since that time, I and friends of mine have scoured the East Midlands trying to find an outlet that sells software for MSX. All that's available game-wise is *Polar Star*, *3D Golf* etc. When it comes to *Hyper Olympics*, *Superchess*, etc I'm told that they will not be available until MSX gets more popular.

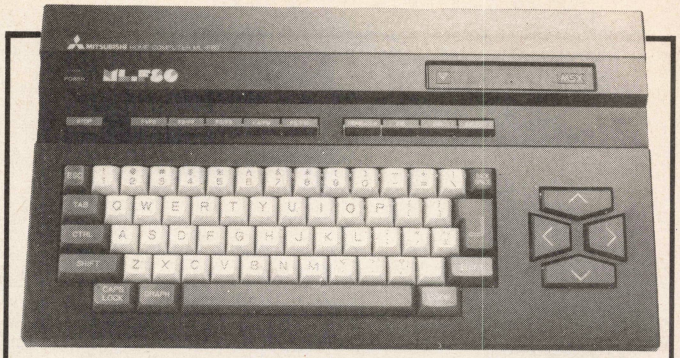
Printers, light pens and most other accessories are just not available here in the Midlands either. I know I can send for them from places down south but why should I have to? I am very unsatisfied with the way that software producers are turning a blind eye to us in the Midlands, and for all I know further North too.

My message to the entire wholesale trade, as well as the retail trade in Leicester and the MSX producers is; 'Come on lads, we bought your product in good faith so don't let us down on the back-up'. If I had a shop selling MSX computers I would want the software to go with it. I'm sure retailers would rather hear the sound of the cash till instead of moans from dissatisfied MSX owners.
Mr T R Allen
Leicester

The problems of keeping the customer satisfied are legion, and we examined the problem in our April issue. If MSX sold in Spectrum numbers, everybody would be stocking MSX software and peripherals.

As it is, many distributors, retailers and software companies have felt the pinch of a very tough winter, and so are consequently being very cautious in what they stock. The first priority must be to stay in business. Customer demand seems to be coming second to this.

What MSX owners should be, and are, doing is pestering dealers, writing to magazines and making their voices heard. We are doing our part, with MSXpress and other offers. We only hope everyone else will do theirs.



It's a bargain!

Over the past few months I have been looking into purchasing a computer. I started to look around the industry and was convinced my first choice was an MSX. The drawback was its price and with this in mind I was within a whisker of purchasing the ZX Spectrum plus at £129.

I walked into a local computer shop, with the knowledge that if the salesman was at all pushy I would walk out with a Spectrum even though I did not feel happy about it.

What greeted me on the shelf was too good to miss. A Mitsubishi MLF80 for £129, completely above board. It only took me seconds to change my mind. Having paid for the computer the salesman was just putting it in a bag when a gentleman leant over the counter to ask the salesman what memory it had. I replied '64K', to which the salesman replied, 'No, 32K — that's why the price is £129.'

I took my purchase home feeling somewhat deflated, but still hoping the shop had made a mistake and that I was onto a winner. I have seen several adverts for Mitsubishi and all of them state quite clearly that the MLF80 has 64K. Does it?
R Cole
Poole

Yes, you're onto a winner!

Those gremlins again

Brilliant! That was my first reaction when opening up your April edition of *MSX Computing*, but was it so? I thought that all my problems were answered.

Firstly I thank you for correcting the error on 3-D Maze and giving such useful information on BASIC hints and short cuts. But when I thought that the game PLANETOID, in December's issue, was corrected, it still did not work. In the edition I bought, anyway, I found a mistake in line 920. It reads "IF PWX-CX)∧2+ (WX−cy) = R*R THEN RETURN". Surely you cannot have a closed bracket without an open bracket. PLEASE can you correct this (grovel).

Anyway, your magazine is magnificent (lies). It has taught me to write my own programs and translate a whole sonata throught the computer.

Disc Warrior is a brilliant game — I have reached a score of 128,225. On *Pitfall II* I have reached a score of 180,128, but *Blagger* still gets me!
Peter Richardson
London SE14

Blame it on gremlins in the typographical department. The printer made (into P. The line should be
920 IF (WX-CX) 2+ (WX-CY) = R*R THEN RETURN
That should solve the problem.

Congratulations on the high scores, anyway. Can anyone out there beat them?

MST-Calc

I wish to point out the following errors in your March review of the *MST-Calc* program.
1. The minimum size of spreadsheet is 20 × 21 cells, not the maximum as printed.
2. You *can* go to nominated squares by using slash key followed by ARROW keys (vertical increments 5 rows, horizontal increments 3 columns).
3. The equations are viewable on the COMMAND line when the cursor is placed on a grid location.

This is not a new product. It has been on the market (in Dragon 32 form) for more than two years and is used and respected by many small businesses. Our programs are written to do a job — not to show off features which are not needed by the user, and which may confuse him. Simplicity in use, and ability to save the businessman time, are the two main attributes of MST software.

Your reviewer is probably a programmer/analyst type — not a business user.
P W Crane
MST Consultants

Our reviewer replies:
With practice, users can

learn to use almost any program within its limitations, and *MST-CALC* does a good job for the price.

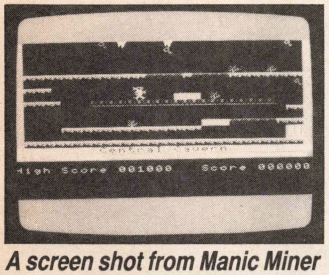
Better documentation would be an improvement. Finding out how a spreadsheet works should not be a matter of trial and error. Overall, at £12.95, *MST-CALC* is good value. But I remain convinced that other, admittedly more expensive, MSX spreadsheets offer more to both the beginner and the experienced user.

Missing platform?

I have purchased a Toshiba and one of the free games was *Manic Miner*. I find that it is impossible to go beyond the sixth frame as the portal cannot be reached by the top most platform.

Any help you can give me will be gratefully received as I like the game very much. I liked your article on music and I hope you have more to come as I would like to put some tunes onto tape in three voices and sounds.

R Lang
Liverpool



A screen shot from Manic Miner

It is possible to get past all the screens in *Manic Miner*. What many people don't realize is that you can stand almost entirely off a platform and still jump. We know — we've done it.

We've plenty more to come on the music front too, Mr Lang. Next month's Music Department will be well worth catching.

Too big to handle

I own a Yamaha CX5M, and recently bought a copy of the *Hobbit*. After several attempts and several different copies I can't get the game to load past the first picture of Smaug. After a couple of minutes of loading the tape stops and the CX5M clears itself. Yamaha knows of no reason why the *Hobbit* won't load into its machine. Any ideas?

Douglas Connor
Edinburgh

I'm afraid your problem lies with the fact you have a 32K MSX Computer, and the *Hobbit* needs 64K. Melbourne House, publisher of the *Hobbit*, has had lots of enquiries from frustrated Yamaha users having difficulty with this game, one of the few which use up more than 32K of memory. Always check the memory requirement of any piece of software *before* you buy it.

What's the hold-up?

About two months ago I purchased a Toshiba HX-10 computer from Rumbelows. It was a good deal at £239.95 which included a free software pack and three year guarantee. The software pack included *Manic Miner, Hunchback and French is Fun*. All the programs worked fine until one day *Manic Miner* just packed up.

I tried to load it again at different volume settings but it still didn't work. So I took it into Rumbelows who said they would change it when some software became available. This was more than a month ago. What's the hold-up?

Apart from that I am very pleased. At my school, where there are at least 600 pupils, not one person has got an MSX. My friends who have Spectrums, Commodores, and BBCs say MSX is no good because there is hardly any software.

Please tell me that they are wrong. Also I just love copying your listing and saving them on tape. Why can't Konami drop the price of its cartridges — although they are excellent, they are expensive.

Lee Whittingham
Potters Bar

If you have any problems with software, it is worth contacting the manufacturer direct. Most will happily exchange faulty tapes. As for the amount of software, several dealers, such as the Axis group and Tavistock Hi-Fi are very strong in MSX software. If your local dealer can't help, there are dealers who are only too willing to get what you want.

Konami's prices are high, due to the cost of making cartridges. Moves are afoot to introduce alternatives to the cartridge, and we have high hopes that cartridge-style software will become available at more affordable prices. We'll keep you posted.

Scarce software

I recently purchased a Toshiba HX-10, and I have been very pleased with it so far. But I am finding it extremely difficult to find software and, moreover, peripherals. I see all these printers, disk drives etc in your excellent magazine, but where on earth do you *get them from!!*

I thought your article on the new Mitsubishi robot in the April edition was excellent — I am now seriously thinking of purchasing one now, that is if I can find out where to get one!

M P Gee
Solihull

We make it our business to search out the latest products and peripherals for MSX, and we sometimes have to see them in a pre-production state. Between a review and availability there can be a delay, so your first step should be to contact the distributor.

Mitsubishi robots are on sale, and you can buy one from Tavistock Hi-Fi in Bedford (tel: (0234) 56323). They sell for £59.95.

Not good enough

I would not let the trade off as lightly as the article in your April issue. The dealers are not helpful if their usual suppliers or warehouses don't list what you want, and they won't or can't try elsewhere. But this is not unique to MSX or indeed to computing, it's the same in video, audio, photography and sporting accessories — you name it.

However, enough of griping. Thank you for an interesting, informative and instructive magazine. I am a newcomer to computing and aged 58 so the step by step approach is much appreciated.

I would be interested to learn how (in simple language) to combine BASIC with machine code in a program, and how to access a memory expansion cartridge.

D E Booth
Southampton

Dealers are coming in for some stick this month. Does any dealer have a reply to Mr Booth's criticisms?

If you want to combine BASIC and machine code, it isn't difficult. There are BASIC commands such as PEEK, POKE, VPEEK, VPOKE, CALL and USR that allow you to use machine code or poke values into memory. Your manual will have details of this, as will some of the MSX books available. *Starting Machine Code On The MSX* by G. P. Ridley, published by Kuma Computers and costing £7.95 is a good place to start.

TALK TO US!

Those of you who buy MSX RS232C interfaces, either from JVC or Kuma will find an invitation to join MSX-NET enclosed in the box.

MSX-NET is a Telecom Gold based network intended purely for MSX micro owners. We will be providing information on the NET (full details to be announced soon). But it is also an excellent way for you to contact us. It saves all that messy and unreliable business with ink, paper and stamps, and it's a lot faster. So if you have a question, a problem or simply something to say, you can send us a few lines.

Any interesting messages or questions will be printed in *MSX Computing,* unless you specifically request otherwise. We'll try to get back to you as soon as possible with the answers to your technical queries, although difficult ones may take a little time, and impossible ones a little longer.

MSX-NET is also a good way of telling us what you would like to see in the magazine, what you think is wrong, and, of course, what you think is right! And any tips you have to pass on to other MSX micro users will be gratefully received.

So how do you do it? For a start, you have to log on to Telecom Gold, system 83. Then go to the MAIL system, write your message and address it to our mailbox — MSX013. We'll be checking the box several times a day, so your words won't go unheard.

Copies of *MSX Computing* are selling like hot cakes (other magazines just look like hot cakes). If you don't get down to the newsagent on time you could miss out on all the latest news, views, reviews and features.
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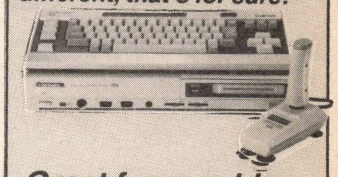

Great for graphics

Trackerball — Marconi has adapted its space age technology to provide a sophisticated graphics input device.

Get down to business

Professional users — see our group test next month when we put MSX word processors, databases and spreadsheets through their paces.

Making music

Exclusive interview with the man behind the first MSX MIDI interface — not to be missed by budding Beethovens.

Software scene

Our usual full reviews of all the latest software — plus pages and pages of listings for you to tap in and run.

THE UNIQUE MSX SYSTEM

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Five page feature...

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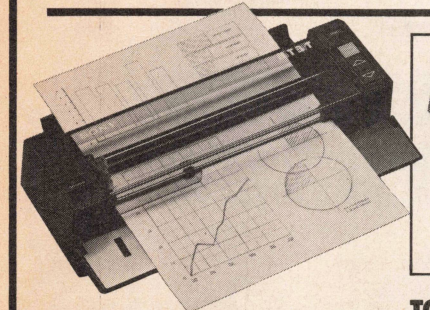

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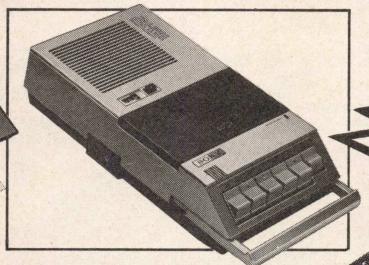

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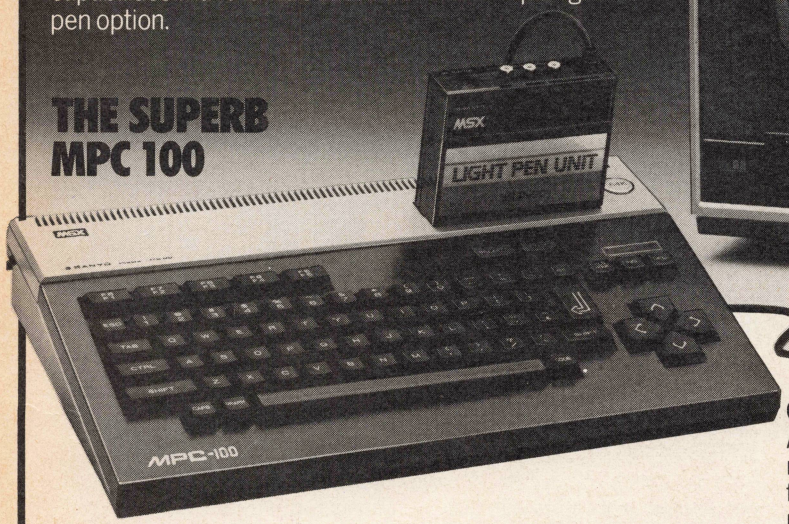

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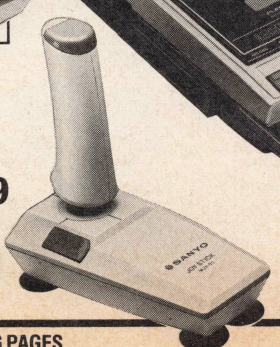

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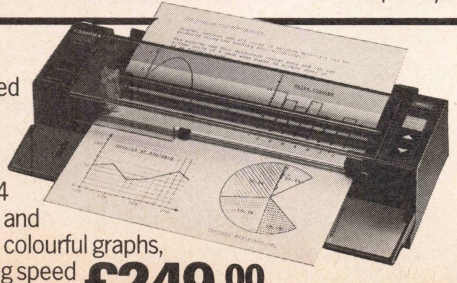

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AXIS

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KING OF THE CARTS

With a background in arcade games, Konami has a lot to offer MSX gamesters. Julia Alexander reports

Konami is famous for producing some of the most spectacular games cartridges for MSX, and justly deserves the nickname 'Cartridge King'. Yet this is all a far cry from the company's humble beginnings in Osaka, south-west of Tokyo some 16 years ago.

The company was founded in 1969 by Kagemasa Kozuki. With a small workforce he specialised in manufacturing games for Japanese games arcades.

Throughout the following decade the company increased its output, acquired a larger workforce and started to make its presence felt in the fast growing arcade market.

Then in 1983 Konami took a gamble — that paid off — by revolutionising traditional coin-operated arcade games. It brought out its first *Track and Field* title, the likes of which had never been seen before.

The game is as close to the Olympics as you can get without actually being there. The graphics are excellent throughout and you can almost see the athletes flexing their muscles!

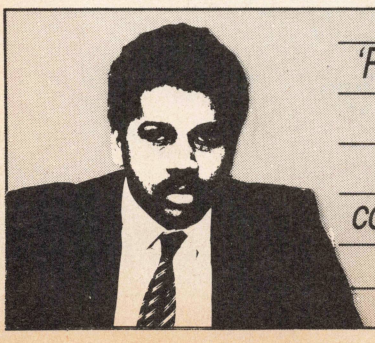
Track and Field was a phenomenal success in Japan and put Konami way ahead of Seega and Namco, its main competitors.

Konami quickly launched more games like *Time Pilot, Super Cobra* and *Sky Jaguar*.

At the same time Konami's interest in the home computer market was aroused by an approach from several of the major home computer manufacturers who wanted high quality, arcade games cartridges for their MSX micros.

In May 1984 Konami UK went into business in Eastcote, Middlesex, and less than a month later its titles were being played in almost every arcade in Britain. *Track and Field* has proved to be one of the most popular arcade games of all time and to date Konami has sold in excess of 50,000 copies worldwide at a cost of £400 each!

Luther de Gale, Konami's UK Marketing manager, says the game sold so well because, 'It was an entirely new concept in arcade games'. He puts its success down to three main ingredients: 'Unlike the real Olympics, players can have several attempts at the events, can compete against other players to break world records and the graphics are excellent.'



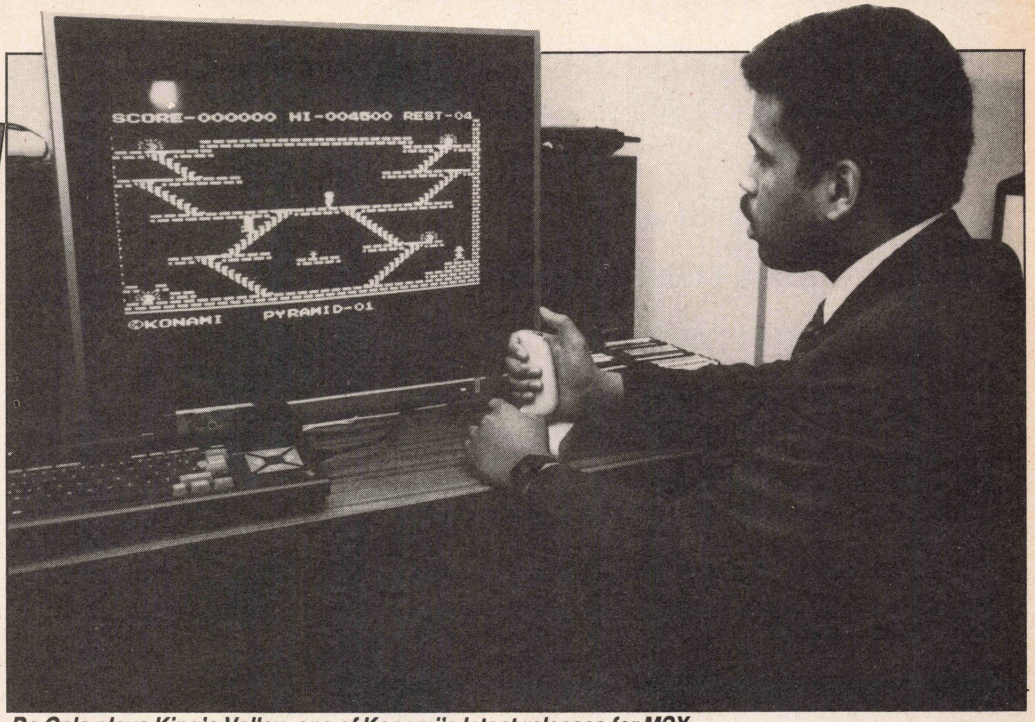
'ROM cartridges are harder to pirate, they're robust, compact and easy to load'

Natural process

But what about MSX? Konami sees the concept of MSX as an entirely natural progression. 'Just like switching from imperial to metric,' says UK director Kenji Hiraoka. 'Standardising micros was a natural process of evolution, just common sense really,' he added. And Luther readily admits that Konami was eager to back the MSX manufacturers with software and take advantage of the potentially worldwide markets.

'We already had several titles for the arcades on pcbs that were selling extremely well, and there was no reason to doubt that they wouldn't be as successful on ROM cartridges,' Luther tells us.

Konami therefore adapted its arcade games for home computer cartridges and the first title released for MSX in Japan was *Antarctic*



De Gale plays King's Valley, one of Konami's latest releases for MSX

Adventure. The game took the Japanese software market by storm and was an overnight success. For months after its release the game was still number one in the software league, outstripping rival games from HAL and Sony. Konami went on to release more titles including *Athletic Land, Hyper Olympics* and *Hypersports 1 and 2*.

Riding on a wave of success Konami decided to really commit itself to the MSX market and when MSX was launched in the UK it was hot on the micro's heels with plenty of software. 'At the time of the launch,' boasts Luther, 'we were the only company with software ready to sell for MSX'.

New titles

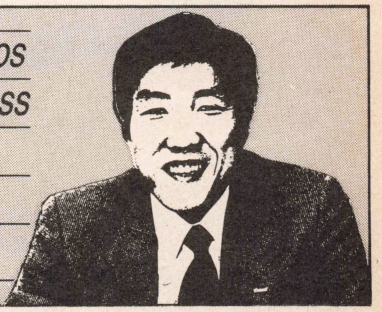
Konami's first game for the UK was the already popular arcade game *Antarctic Adventure*. In a very short time the antics of the penguin in Antarctic climes were being enjoyed by MSX games players up and down the country.

The company soon released more titles, including *Hyper Olympics 1* and *2*, which proved to be equally as popular. Currently Konami has released a total of 18 out of 22 cartridges, the latest being *Kung Fu* and *King's Valley*.

Two more are planned for release later this year but it's unlikely that the third, *Baseball*, will be a great hit here as Konami feels that, although popular in Japan, too few British computer users know how to play it.

Konami has only ever released its games on ROM cartridges, and curiosity as well as downright nosiness prompted me to ask Luther why. 'ROM cartridges are harder to pirate, they're robust, compact and easy to load,' he said, and continued: 'Japanese and American computer buffs prefer to use cartridges, it's really only the British that fiddle around with cassette tapes'.

'Standardising micros was a natural process of evolution, it's just common sense really'



Luther sees what he calls the 'British cassette tape mentality' as an historical problem whose roots lie firmly at the feet of Sir Clive Sinclair, doyen of British home micros. He strongly believes that cassette tapes wouldn't play such an important role if Sinclair hadn't brought out a computer system based around them.

And he went on to destroy quickly my argument that cassettes were cheaper, citing the fact that some of them are now creeping towards the £11 and £12 price tag. Konami reckons that the average hacker isn't going to gripe about paying £17.40 (all the company's games are now the same price) for a 'high quality action packed game'.

Both Kenji and Luther are quick to attack British software houses and claim that most of them are run by amateurs and part-time programmers in a back room, who couldn't possibly bring out games with the same high quality as themselves.

As for the competition, as far as Konami is concerned it doesn't have any! In Japan its main rivals are HAL, ASCII and Sony. As for the UK the only real contender in the cartridge field at the moment is Panasonic which has only recently started releasing cartridges.

When I mentioned that Electric Software is planning

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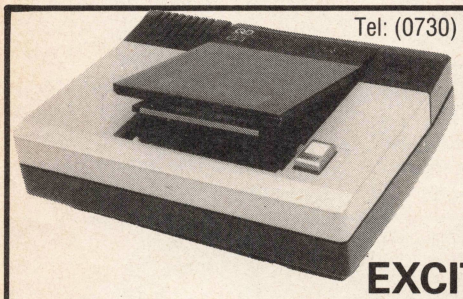

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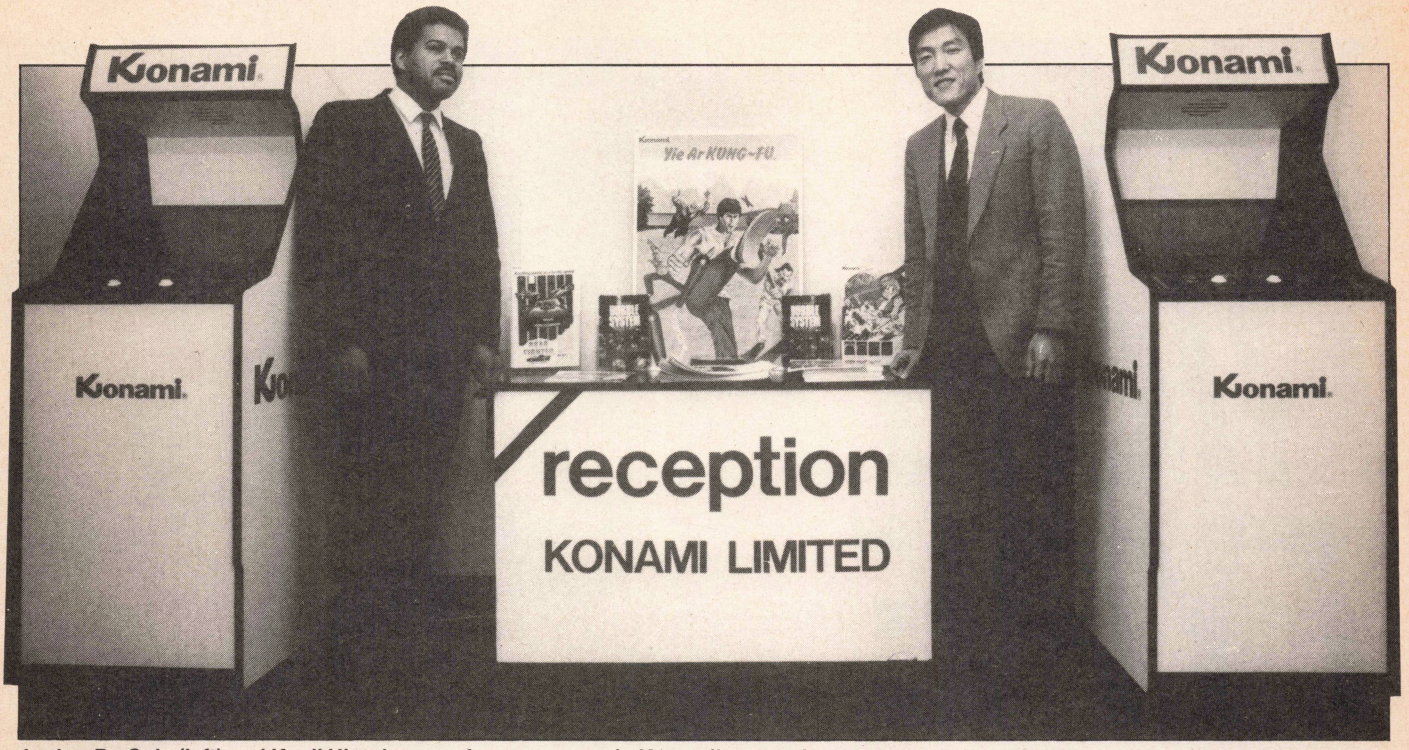


Luther De Gale (left) and Kenji Hiraoka pose for our camera in Konami's reception area

to launch low cost cartridges using a new chip technology, Luther remained cool, calm and collected and replied: 'If someone wants a good game they will buy ours. If Electric intends to bring out high quality cartridges it will incur the same costs as us and will have to higher the price of the cartridge.'

'There is no other company that can put as much effort into a game as Konami,' insists Luther. And he went on to explain how the company sent its programmers and designers out to athletic events before producing *Track and Field*. 'We actually observed athletes, watched how they moved and tried to capture their actual physical movements. We aim to make our games as close to reality as possible.'

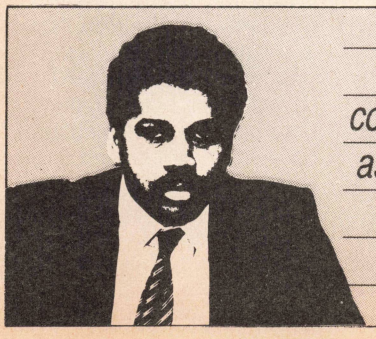
'Competition is fierce but at the end of the day the best wins and at the moment that's Konami and we intend to keep it that way,' said Luther with a very optimistic glint in his eyes.

As for the future, Konami has set its sights on dominating the software market — not just in Europe but worldwide. It has recently opened offices in Frankfurt and Illinois. The company's aim is to generate enough business so that it can keep feeding the factory in Japan.

Health title

There are no plans to open up manufacturing plants outside Japan, and Kenji Hiraoka is quite candid about the reasons why: 'There are too many strikes in Europe, the workforces are lethargic and the workmanship is shoddy'. At that point I quickly changed the subject!

Konami is currently looking to the future and plans to release titles in the education, business and health fields towards the end of the year.



'There is no other company that can put as much effort into a game as Konami' insists Luther

'The health title is likely to be based on questions and answers relating to the user's health'

Although no details have been finalised Kenji Hiraoka hints that the health title is likely to be based on questions and answers relating to the user's health, incorporating checks on blood pressure, diet and general well being.

The company has recently introduced a laser disk game called *Badlands* to Japanese arcades which is based on a western theme, and there's a strong possibility that it could soon be seen in British arcades too.

The future

Konami is also planning to release some of its titles on floppy disks but at the moment the company doesn't believe the market's big enough to make the venture financially worthwhile.

The future for Konami certainly looks very rosy. Last October the company went public on the stock exchange. The day before its shares were expected to sell for 50 Yen, but on the actual day the price of an ordinary share soared to a staggering 6000 Yen, and a week later shares were changing hands for 10,000 Yen at a time — and immediately made headline news in Japan.

Kenji Hiraoka admits the price went way above the company's expectations but said: 'Konami is the type of company that is in fashion. With a stable company like Sony or Hitachi you're not likely to make any money with their shares. With a young and innovative company like us you can make a lot of money very quickly.'

With an annual worldwide turnover of £33 million and games like *Sky Jaguar, Baseball* and *Tennis* continually topping the software charts in Japan, it's no wonder Konami is proud of its track record.

THE RIGHT TYPE

You don't have to pay over the odds for an MSX printer. We review the latest Hudson model

Of the range of computer peripherals available, possibly the most invaluable is a printer. As it is a relatively expensive piece of hardware, the decision to purchase one should not be taken lightly.

Which type of printer you buy will, of course, depend on what you use your computer for. It is no good buying a daisywheel if you want to print out a lot of graphs and diagrams.

High letter quality is not too important for program listings, either. A cheap thermal printer may be fine for any of these uses, but lets you down if you want to produce presentable documents.

Most computer users will opt for the most flexible compromise — a dot-matrix printer. Printer technology has advanced to the stage where a dot-matrix can produce near letter quality (NLQ) output if you want it to, yet still be useful for run of the mill listings.

Thanks to the Centronics interface included in every MSX computer, there are literally hundreds of dot-matrix printers to choose from. Principally, they vary in print quality and speed, and the number of different character sets that can be produced.

There are already MSX printers around which can reproduce all the MSX characters, including the unusual ones like musical notes and graphics symbols. They tend to be on the pricey side though — about £100 more than you would normally expect to pay for a printer with similar features but without the special MSX characters.

The Hudson JP130a is a fairly typical example of the latter type of printer, and is distributed in the UK by Microlink.

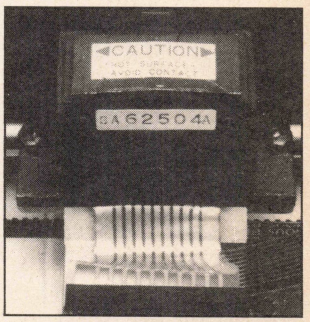
From the outset, the printer is designed for both pin feed (tractor) and friction paper feeding. This allows single sheets to be used for correspondence and the like, while roll or fanfold paper can be used for listings or rough drafts of documents.

The maximum paper width is 80 characters

Normal Typeface
Bold Text
Enlarged
Condensed
Enlarged and Condensed

Superscript

Subscript



(Above) Sample typefaces
(Right) The print element

(approximately A4 size paper) which is fine for most purposes. This restriction will only cause problems if you produce large tables or printouts from spreadsheets.

The unit is a rather boxy looking affair styled in a sombre beige and cream colour. A smoked perpex lid covers the print and tractor mechanism.

This lid must be opened to feed sheet paper into the printer. Ideally, it is best left open while printing single sheets as the paper tends to snarl in the lip of the lid.

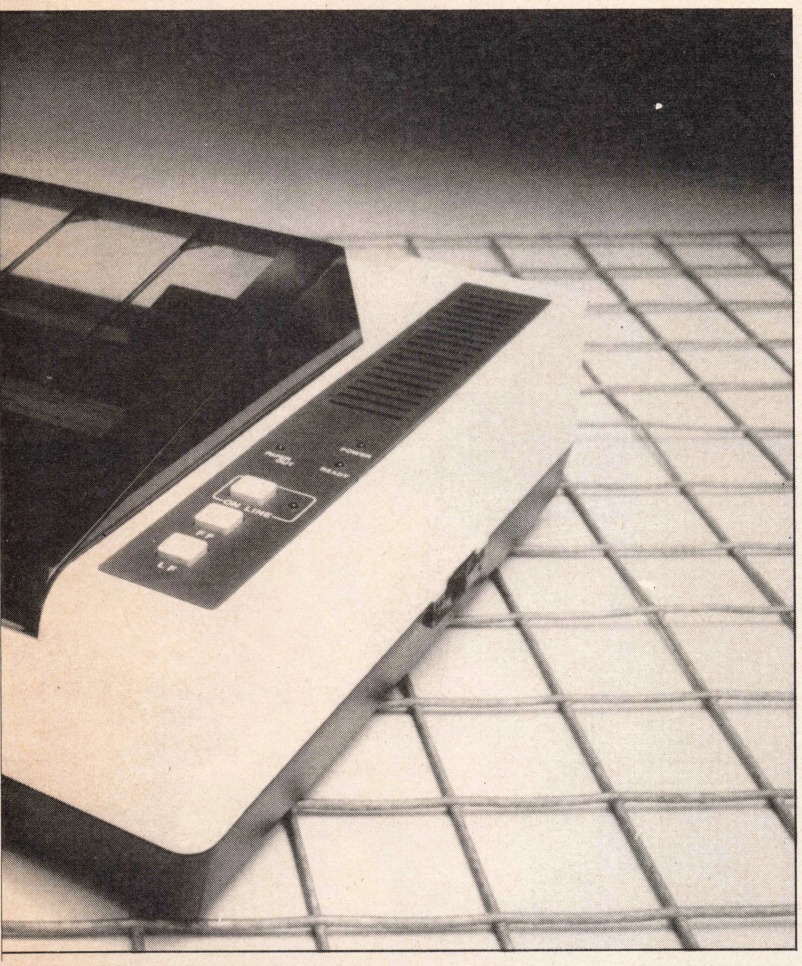
Three control buttons are provided — line feed, form feed and the obligatory on-line button. A set of status lamps complete the control panel. These indicate power on, printer ready and on-line.

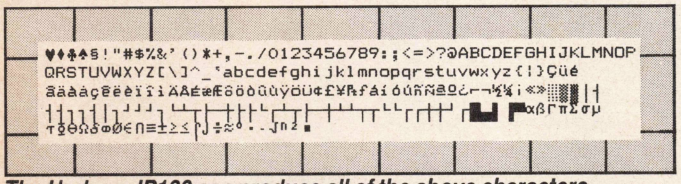
When the paper runs out, a red lamp lights, accompanied by a strident warning tone. There is no way of turning off this tone which can become irritating when single sheets are used extensively.

Replacing the printer ribbon is simplicity itself. The ribbon is a continuous loop contained in a wide plastic cartridge. All you have to do is clip the cartridge into place on the drive spindle, put the ribbon between the print head and platen and wind up the ribbon until taut. The process takes a matter of seconds, and leaves your fingers surprisingly ink-free.

The advantage of a loop

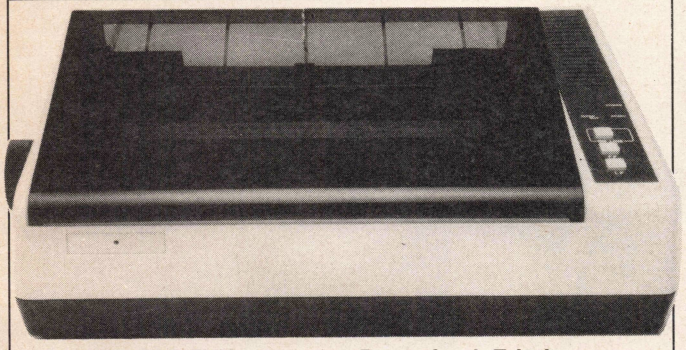
moves bidirectionally





The Hudson JP130 can produce all of the above characters

HUDSON JP130A



SPECIFICATIONS

Model name: Hudson JP130a
Type: Dot-matrix printer
Print speed: 130cps
Character pitch: 5, 8, 10, 12, 15 cpi
Paper width: 215.9mm
Max columns: 80
Max paper thickness: 0.25mm
Paper feed: Friction, tractor
Interfaces: Centronics
Dimensions: 586mm × 358mm × 130mm
Weight: 8.5kg
Price: £264 including VAT
Distributor: Microlink, Bowyers, Steep Marsh, Petersfield, Hampshire

ribbon is that it is up to you to decide when the life of a ribbon is over. You need only change it when the print is finally unreadable.

A lever inside the printer allows you to adjust the distance between the platen and the print head. Various paper thicknesses can be accommodated in this manner.

The type quality is vey good. All the characters are very crisply produced, with little or no smudging in evidence. What is most incredible is that this reasonable print quality is obtained at such high speed — normally 130 characters per second. Printing is also bi-directional which further improves print speed. The only minor criticism is that the typeface can be a little tiring on the eyes, a point worth noting if you write a lot of text.

Speed does bring its disadvantages. This printer is not one of the quietest you'll encounter but tolerable all the same. The noise might be out of place in some office environments.

The amount of memory in the printer set aside as a print buffer seems to be quite large. If you abort printing halfway through a page, the printer will go off-line but its buffer will still contain a considerable amount of data.

This data will be printed as soon as the printer is put on-line again.

The Hudson JP130a is MSX-compatible but not an MSX printer. It will print a number of, but not all of the MSX characters.

The symbols for the card suits are given (◆ etc), as are a number of special foreign language characters — currency symbols and accented vowels. All the Greek and scientific characters, and a few of the graphics symbols are also present.

The musical notes and smiling faces are conspicous by their absence.

The problem often encountered in program listings is confusion between the symbols "#" and £. Thankfully, this printer knows the difference, particularly important if you are listing statements like PRINT USING which often use both symbols.

By sending a series of special codes to the printer, you can obtain different printing effects. The most universally accepted standard is that used by Epson.

The Hudson printer conforms to most of these codes. This allows it to be used with a great deal of commercial software — just select the Epson option and you're away. It is unlikely that you would ever need to configure your software for this printer.

Elite or Pica pitch may be selected using these codes. Various effects like condensed, enlarged, underlined and emboldened text may also be produced — see our examples opposite.

The nicest thing about dot-matrix printers is that they may be used to produce hard copy of screen images. This printer has three bit-image (dot plotting) modes — single, double and quadruple density. Single density gives the lowest resolution.

Using bit-image plotting, you can even create your own character sets to cater for typestyles like gothic and italics. Printing out graphics images can be tediously slow, so the relatively fast speed of the Hudson is welcome here.

Dot-matrix printers usually have a set of DIP switches which allow you to set things like perforation skipping and form length. These are not easily accessible. You have to open up the printer by removing four screws from the base of the unit. Presumably, Hudson believes that all printer options should be set under software control.

Overall, the JP130a is an inexpensive, sturdy printer.

Although Microlink omitted to supply us with a manual, we managed to obain a good overall impression of the machine. The print quality is good enough for word processing, but single sheet feeding is perhaps more tricky than it needs to be.

If you need a sound workhorse of a printer and don't want to fork out over the odds for a *bonafide* MSX printer, then you could do much worse than this.

MUSIC MAES

Tim Markes lets the music do the talking in his BASIC beginners' guide

We discovered last month that 'variables' are a key feature of BASIC programming on MSX. Now we are going to explore 'loops' and 'decisions'.

A major characteristic of your computer is the ability to change the program instruction sequence depending on the value of one (or more) variables.

So let's go back to BASICs again — and musical ones this time — to check how to crack loops and decisions. What, for example, is the shortest 'changing direction' program ever written? I guess this must be close to it:

```
10 GOTO10
(RUN)
```

The absence of the block cursor on the screen shows that the program is running — but not doing a lot. We call this looping; you will need to use CTRL+STOP to generate the 'Break in 10 . . . Ok' and return to command mode.

We can make the program do something by including an instruction inside the loop.

The following program will run a pattern of stars all over the screen:

```
20 PRINT "*";
30 GOTO20
(RUN 20)
```

Here is a very simple interactive program using a loop and one variable (for a person's name). It also illustrates the INPUT . . . PROCESS . . . OUTPUT principle you should now begin to recognise:

```
40 INPUT A$
50 PRINT "Hello" A$;
60 GOTO50
(RUN40)
```

Most interesting programs need both loops and 'varying variables' — variables which change value during the program sequence. Otherwise the program would just produce the same result over and over again, wouldn't it?

Well, not necessarily, actually. You can design programs to produce different effects depending on the input alone — like the one above. The use of random numbers will also affect the program output; here is an unusual example making use of TIME:

```
95 '**STOPWATCH!**
100 TIME=0:CLS
110 LOCATE 8,12: T=TIME/
    50
120 PRINT INT(T/60);T MOD
    60
130 GOTO110
(RUN100)
```

This will produce a stopwatch effect on the screen (minutes and seconds). TIME is a special location which is incremented automatically by MSX computers 50 times a second. INT loses any decimal portion of a number. MOD produces the remainder (seconds) after division of T by 60. See if you can amend the program to produce an actual time display, after an initial INPUT of the current time.

Each time the stopwatch sequence performs the loop sequence (110-130), the variable T is reset with the (automatically incremented) value of TIME. This is less common, however, than the next example, where the program itself alters the value of the variable.

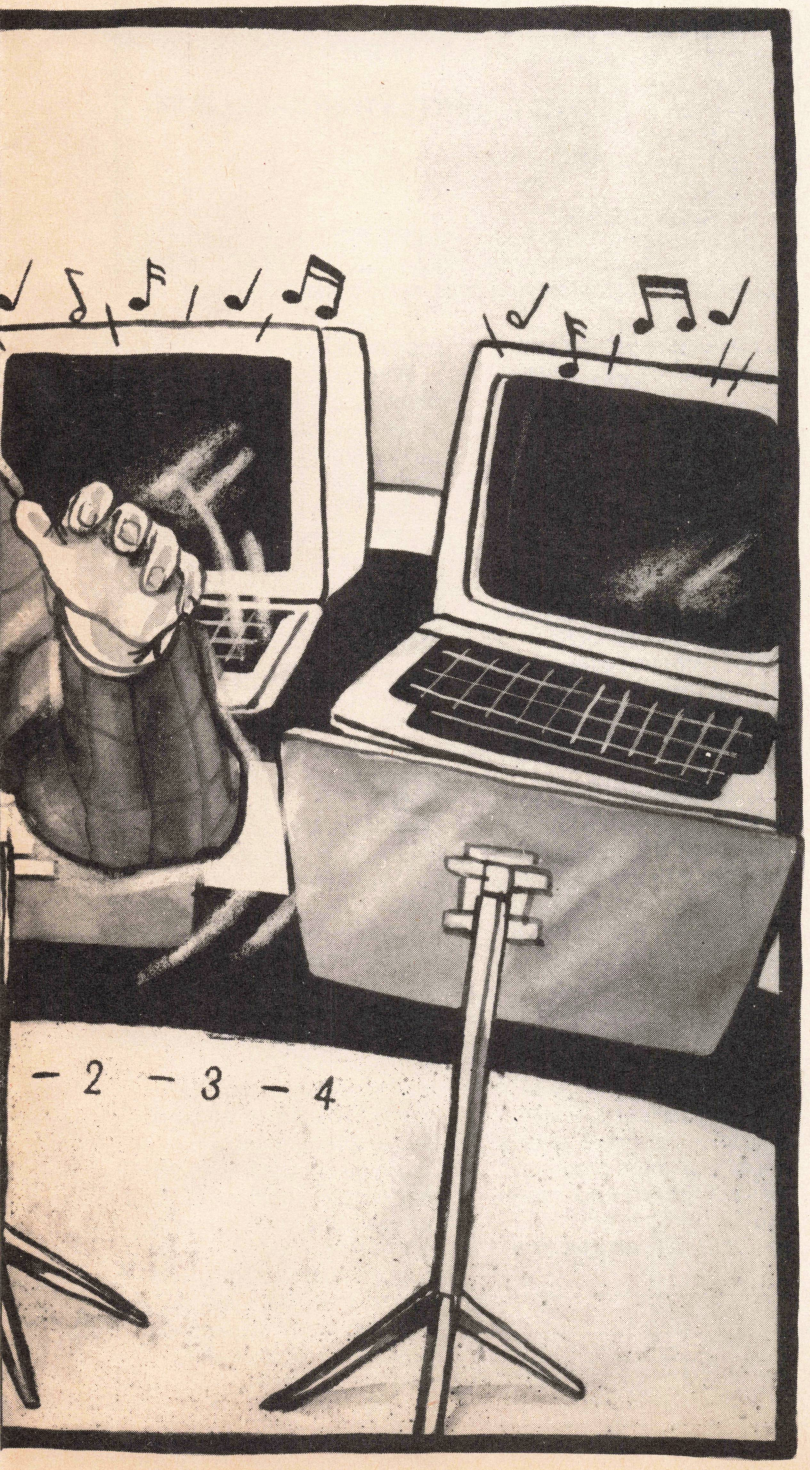
```
145'**Chromatic Scale**
150 X=X+1
160 PLAY "N=X;"
170 GOTO150
(RUN150)
```

Listen to an ascending chromatic scale (all semitones) covering most of the range of the sound chip. When you RUN a program, the value of any numeric variable is set to zero, so an initial X=0 program instruction is not necessary (see line 150). More important, though, is that the program becomes illegal doesn't it? Like this:

```
Illegal function call in 160
Ok
```

Illustration by Marc Arundale

C STRO!



MSX clearly doesn't like the PLAY instruction in line 160; since the only variable involved is X, check its current value using PRINT and you find that the program goes illegal when X=97. The format of PLAY is not that easy to remember — perhaps the simplest way of explaining the 'N' function briefly is like this:

```
PLAY "C"
PLAY "N36"
C=36: PLAY "N=C;"
```

Each of the above program instruction lines causes a Middle C to be played on your machine. But C=36:PLAY "NC", on the other hand, is illegal. Adding or subtracting 1 from the 'value' assigned to N will raise (or lower) the note sounded by a semitone.

The full range of permitted values for N is from 0 (silence) to 96. The lowest note is C three octaves below Middle C on the piano (N=1) and the highest is C five octaves above Middle C (N=96).

Hence PLAY "N97", or any equivalent version using variables, is illegal. Clearly we need to insert an instruction into the sequence before PLAY to ensure that 'if X=97 then end'. Fortunately, BASIC lets us do this literally.

Try inserting a new line 155 like this:

```
155 IF X=97 THEN END
```

We could equally have written the instruction IF X>96 THEN END which should be self-explanatory. Both these are simple examples of a program testing the CONDITION of a variable and taking action depending on the result.

The main conditional tests and symbols (called 'operators') which IF uses are:

EQUAL	=
NOT EQUAL	<>
LESS or EQUAL	<=
MORE or EQUAL	>=
LESS THAN	<
MORE THAN	>

Making decisions can be quite a complex business and the command IF is capable of some quite freaky reasoning. But at this stage it's best to think of the format as looking like this:

IF condition is true THEN do this instruction
IF condition is not true, perform the instruction on the next line.

Suppose we want to play a chromatic scale, through one octave, of 12 semitones? Let's also have the scale ascending and descending continuously starting from Middle C.

Using the IF command, we can check when the loop sequence has reached the top OR bottom of the octave and switch the (semitone) increment from +1 to −1 appropriately. Here is how the program might look:

```
200 ' **Cyclic semitone
    scale**
210 X=36: Y=1
220 PLAY "N=X;"
230 X=X+Y
240 IF X=36 OR X=36+12
    THEN Y=-Y
250 GOTO220
```

Before delving further into the IF command, let's look at another way of playing a semitone only scale.

```
300 FOR X=36 TO 48
310 PLAY "N=X;"
320 NEXT X
```

MSX BASIC remembers the FOR X= . . . line and waits for a matching NEXT X instruction. NEXT returns to the FOR instruction, which increments X by 1 and repeats the instructions in the loop until X has reached the limit (TO 48), when the program proceeds to the instruction immediately following NEXT. Phew!

Naturally BASIC can step through a range of numbers with an increment other than one (positive or negative). Continuing the musical theme, then, here are two more scales using FOR . . . TO . . . STEP.

```
350 'Diminished Chord
    (ascending)
360 FOR X=36 TO 60 STEP
    3
370 PLAY "N=X;"
380 NEXT X
390 'Whole tone scale
    (descending)
490 FOR X=60 TO 36 STEP
    -2
500 PLAY "N=X;"
510 NEXT X
```

Both the above are two-octave scales, N=36 to 60. There is nothing to stop us

altering X during the loop, independently of the FOR/NEXT system — although this is perhaps a little eccentric.

For our eccentric readers, then, let's change the final descending octave into a conventional major scale by adding the following line:

```
505 IF X=48 OR X=41 THEN
  X=X+1
```

FOR . . . TO . . . NEXT and IF . . .THEN are the really crunchy bits of programming. Like life itself (this is the philosophy interlude), you must decide what sequences can really be described as just repetition within certain limits. Also decide precisely what questions you need to ask during your journey to get the results you are aiming for.

So far we have looked at the simple applications of FOR and IF, but separately and combined they are capable of considerable sophistication. Suppose, for example, we would like to check the range of background colours (range BLACK=0 to WHITE=15). Try this:

```
550 FOR C=15 TO 0 STEP
  -1
560 COLOR ,C
570 FOR T=0 TO 1000:
  NEXT
580 NEXT C
590 END
```

Notice that we need to include another FOR . . . TO . . . NEXT loop within the colour changing loop. This is purely a time wasting loop to slow the whole process down, so that we can see the colour sequence at a reasonable pace.

This illustrates the fact that FOR . . . NEXT loops can indeed be 'nested' — many times in fact, if you feel that way inclined. The only limitation is computer memory, but, other than for complex mathematical iterations, it doesn't seem to be a very healthy or productive form of addiction!

We can also use variables with FOR . . . TO . . . NEXT of course. Try this, for example:

```
600 'Cyclic scales
610 O=36: X=0: Y=12: Z=1
620 FOR T=X TO Y STEP Z
630 P=O+T: PLAY "N=P;"
640 IF Z=1 AND T<>4 AND
  T<>11 THEN T=T+1
650 NEXT T
660 SWAP X,Y: Z=-Z
670 GOTO620
```

Notice that variables have been used extensively. This means, for example, that to change the pitch of the 'exercise', you just have to change the initial value of O; or perhaps modify the program to accept a start position via INPUT.

The sequence uses a command you may not have come across before — SWAP. MSX BASIC lets you swap the assigned values between two variables — in one instruction. It is particularly useful in any logic which seems to 'do it again, but the opposite way round'.

Line 640 needs some explanation too. Here we are taking a semitone scale and 'massaging' it into a familiar major scale. The logic is as follows:

'If the notes are ascending (Z=1) AND the note (T) is NOT EQUAL (<>) to the fourth semitone in the scale (E) AND also T is NOT EQUAL to the 11th semitone in the scale (B) . . . THEN (and only then) raise the next note (T) by an additional semitone (1).'

Another method of playing a major scale over a number of octaves uses an additional facility of IF — like this:

```
700 T=24
710 PLAY "N=T;"
720 IF T=72 THEN END
730 IF T MOD 12=4 OR T
  MOD 12=11 THEN T=T+1
  ELSE T=T+2
740 GOTO710
```

This sequence uses ELSE, the less familiar, but still useful feature of IF. We are essentially saying — IF the note is an E or a B just add one semitone ELSE add two.

```
800 'Minor Scales + display
805 SCREEN 2
810 FOR O=24 TO 36 STEP 3
820 CLS: A=2: T=0
830 LOCATE 6,4: PRINT "Melodic Minor"
840 FOR C=1 TO 15
850 COLOR,,T
860 IF T=0 THEN Z=1 ELSE IF T=12 THEN Z=-1
870 IF GAP=1 THEN K$="Half": COLOR ,13 ELSE
  K$="W": COLOR ,14
880 IF T=0 THEN K$="Tonic": COLOR ,12
890 A=A+1: D=20-T
900 LOCATE A,D:PRINT K$
910 P=O+T: PLAY "N=P;"
920 FOR Q=0 TO 400: NEXT
930 'Check the Half/Whole tones?
940 IF Z=1 THEN IF T=2 OR T=11 THEN GAP=1 ELSE
  GAP=2
950 IF Z=-1 THEN IF T=8 OR T=3 THEN GAP=1 ELSE
  GAP=2
960 T=T+GAP*Z
970 NEXT C
980 NEXT O: END
```

Figure 1: This program plays various melodic minor scales

In fact the more general form of IF is:

IF <condition> THEN <statements> ELSE <statements>

Each condition can be expressed with AND/OR if you wish. There is also a NOT, but this can always be replaced by the appropriate <> (not equals) expression — so you don't really need to remember it.

A statement (instruction) can of course be 'GOTO line no.' — and MSX BASIC will allow you to leave the GOTO keyword out, if you wish. Furthermore, you can have several statements after THEN or ELSE and any statement can itself be an IF!

You can get into some highly dodgy reasoning, unless you take great care. IF you need accuracy, THEN keep your IFs simple, even IF you take up more program lines than strictly necessary ELSE you'll be in trouble — and it doesn't make healthy reading either.

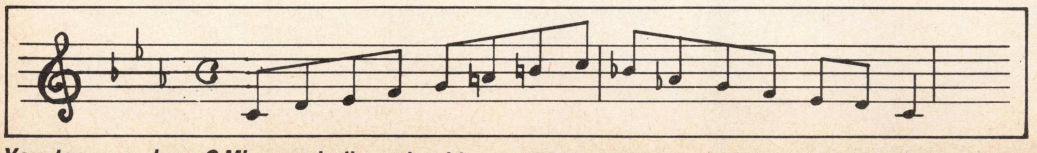
Remember that every FOR must have a matching NEXT and vice-versa; it is bad programming practice to exit from a FOR . . . NEXT loop (using IF say) without completing the count — and you might hit bugs, if your program is complex. There is always your friendly error message:

NEXT without FOR

to help concentrate the mind!

But finally, here is another chance to see how to use FOR . . . TO . . . NEXT and IF in practice. The program in Figure 1 is designed to play various melodic minor scales.

It also gives a pictorial display, showing how the scale is composed of whole tones and half tones. There are many more subtleties to IF which we may explore later, but the logic we've covered so far is reasonably complex. Once you get confident with checking the condition of variables and making the right moves, your programming should improve tremendously. When your improvement seems to be in leaps and bounds — or earlier — remember to try SUBroutines, which we will cover next month.



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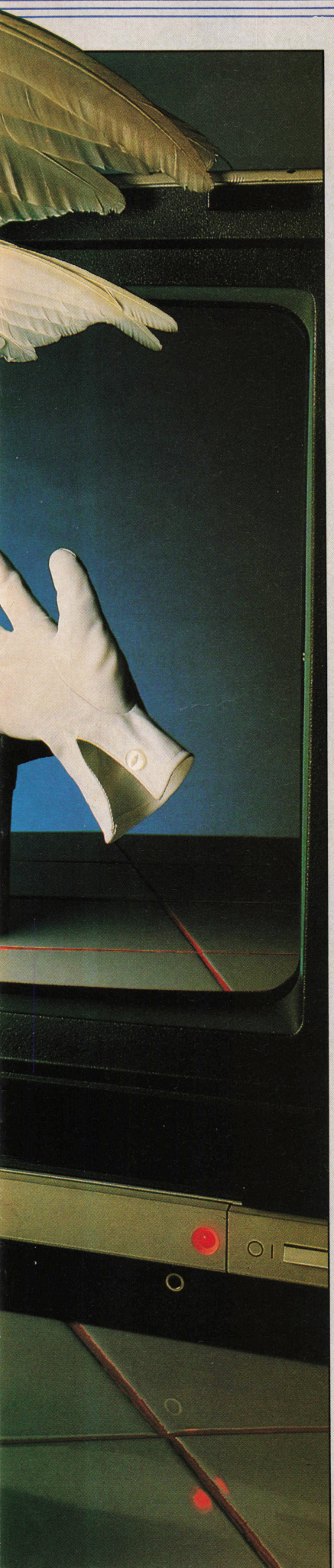


MAGIC TOUCH

Grafpad is the first graphics tablet on the MSX scene. But can it live up to its high price tag?

Want to put a picture on the screen, but have trouble with those nasty BASIC commands? Don't worry, there are alternatives to grappling with programming, and we've just taken a look at one — the Grafpad from British Micro.

This is a graphics tablet — which doesn't mean it's a pill designed to cure headaches caused by fuzzy pictures.

A graphics tablet is a kind of electronic doodle pad. It's most common application is as a sketch pad. You draw on the pad with a pointer or 'pen', and the design appears on the computer screen.

But graphics tablets have other uses too. You can create a kind of simplified or specialist keyboard, perhaps with ikons or diagrams in place of letters.

When designing computer graphics to use in a program it's often difficult to precisely judge the correct co-ordinates for a line or shape drawing command. A graphics tablet can help. To find the co-ordinates of a specific spot, simply place the pen on the corresponding part of the tablet and, with suitable software, the computer will give you the figures you need.

So a graphics tablet is certainly a versatile peripheral, and the Grafpad seems to be a fairly good example of the type. But before making any comments about its performance, we should point out that the sample we tested was a pre-production one.

The final production version should appear in the shops around the beginning of May, costing £125. But British Micro is being held up by the non-arrival of cartridge cases from Japan — so don't blame us if you can't get hold of one.

If you *can* get hold of one, what you'll find in the package is the pad itself, a sheet of Perspex, a cartridge attached to a length of ribbon cable, some software on cassette, and a set of instructions.

The pen used with the Grafpad is permanently attached to the tablet by an adequate length of cable. The pen contains a sensor which reads a signal pulsed through a grid in the tablet. Through a simple process of triangulation, the computer can work out where the pen is placed.

So that the computer isn't constantly trying to read a location even when the pen isn't pointed at anything, a microswitch is incorporated into the pen tip. You have to press the pen lightly on to the tablet in order to activate the signal.

The tablet connects with the micro via the ribbon cable and cartridge. To protect the surface of the tablet, you put the Perspex sheet on top of it. The signal will pass quite happily through materials up to 10mm thick, so this sheet poses no problems.

Indeed, British Micro suggests that you replace the Perspex with a more robust sheet of glass.

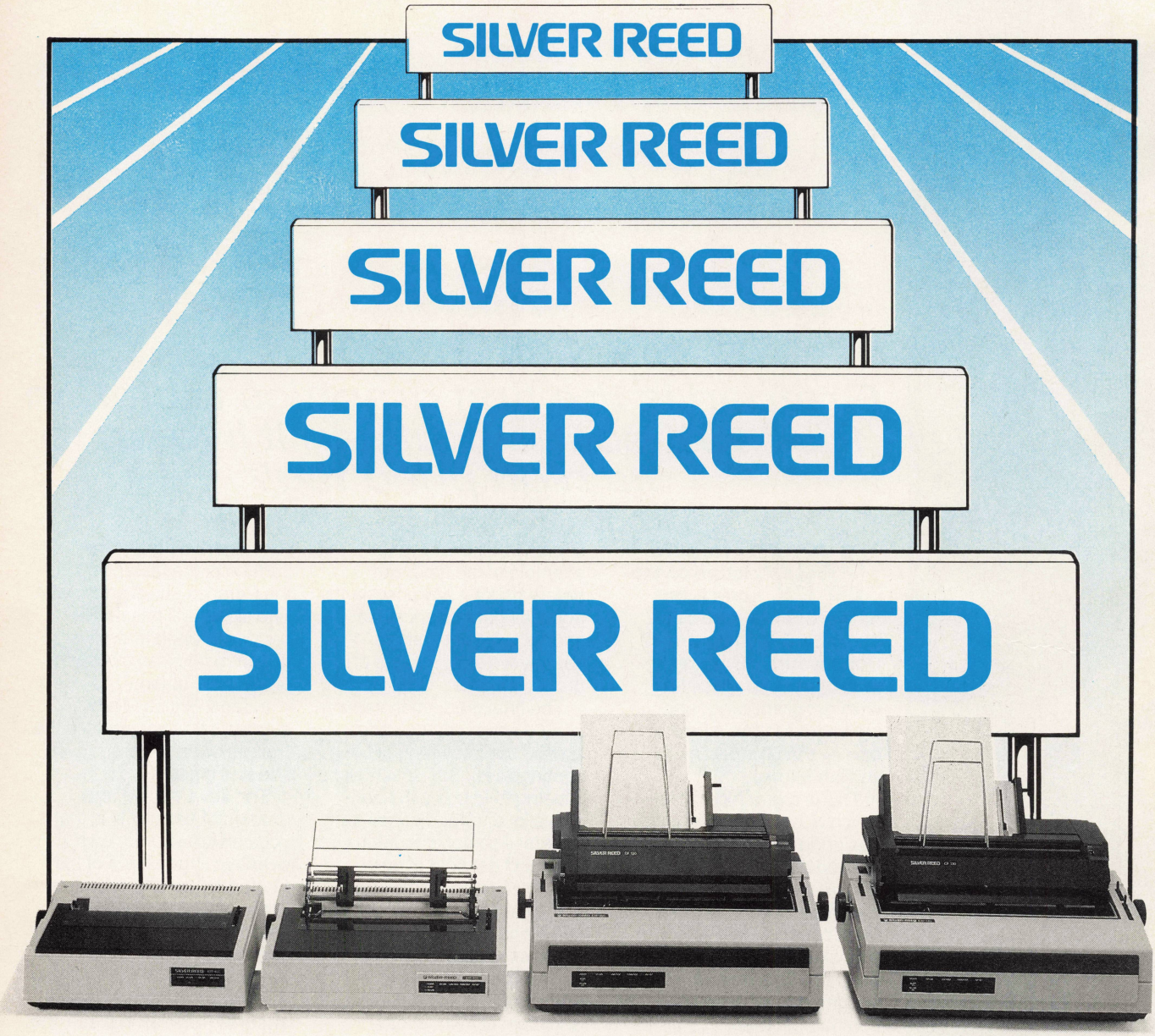
The advantage of this amount of sensitivity is that you can create your own overlays to go on top of the Grafpad. And any diagrams, maps or whatever that you want to copy on to the screen can simply be placed on the tablet and traced with the pen.

Even with the standard sheet of Perspex in place, the Grafpad will still work with additional materials up to 5mm thick. This would not be possible with the other common design of graphics tablet using a membrane surface which has to be depressed to register pen contact.

As a result of its design, the Grafpad maintains its accuracy right up to the limits of its operating specifications — that is, it's as good with a thick overlay as it is with a thin one.

You know when it has reached its limit by the fact that the on-screen cursor starts zipping wildly around

Clearing Business Hurdles



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the screen, when you're using the supplied software. So this software can usefully be employed to test the tablet for any applications you might have in mind.

However the main function of this software is to allow you to create pictures on-screen with maximum ease — as an alternative to a light pen, for example.

A look at the box below will give you an indication of how versatile this software is, although it's worth pointing out that the early version of the software we saw wasn't a full implementation — certain functions were missing.

For one thing, although the commands to SAVE and LOAD screens are mentioned in the instructions, these facilities were absent from the software. At the time of writing British Micro is working on these features, but there is a slight problem in the time it takes to store a screenful of information with cassette-based systems. The company is really looking towards disks to solve this problem.

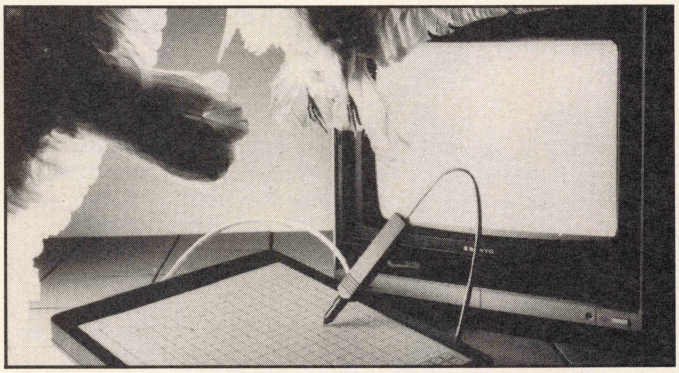
The other feature which was missing was the facility to dump the screen to a suitable printer. Two Epson models are mentioned in the instructions — an odd choice considering that fully MSX compatible printers are starting to appear. But it may have more to do with the software being converted from other machines than the former non-availability of MSX printers.

Fortunately, all the other features were present and correct. It's worth pointing out at this stage that the versatility of the Grafpad does not rely on this piece of software. The tablet can be fully software configured — of which more later — so you're only limited by your own programming ability.

Nevertheless, most people who will buy the Grafpad will use the software provided, at least at the beginning, so it's worth seeing what it offers.

The first program on the tape simply lists the options available, and doesn't tell you anything that's not in the manual. Then the second program is LOADED in, and that's the one which actually lets you do things.

The working area of the screen goes black and a quick press of the pen causes a cross-hair cursor to appear. This is called an *uncommitted* cursor because it doesn't actually do anything except tell you where you last placed the pen.



Committing the cursor to a specific task is done simply by pressing the appropriate key on the keyboard while holding the pen on the tablet.

For example, to draw a line you press L. This sometimes takes a moment to register, but eventually a small L will appear next to the cursor. You then move the cursor to the point where you want the line to start and press RETURN.

The cursor then becomes fixed and a second arrow cursor appears. This you move to where you want the line to end. Pressing RETURN again draws the line and takes you back to the uncommitted cursor.

A straight line isn't the only option. You can just as easily draw freehand. But you have to be careful with this. You don't stop drawing until you press RETURN for the second time. If you just lift the pen off the tablet and put it down somewhere else, the machine draws a line from the last point of contact to the new one.

This feels unnatural — it would be better if the software were to perform a 'pen-up' operation each time you lift the pen off the tablet. Drawing triangles is similar to drawing lines, except that you have to mark three points instead of two.

Rectangles, circles and ellipses are easy to create. In each case you start by marking one point — with rectangles it's one corner, with circles/ellipses it's the centre.

If you've selected the rectangle option, moving the pen reveals three more cursors, in addition to the fixed one marking the first corner. These show the other three corners, and the pen actually controls the one diagonally opposite the first marker. Pressing RETURN draws the rectangle.

With the circle/ellipse option, four extra cursors appear, representing the limits of the X and Y axes. if all four cursors are an equal distance from the centre point, you'll get a circle when you press RETURN, otherwise you'll get an ellipse.

In fact, it's very difficult to draw a perfect circle, and frequently the final shape is drawn well inside the cursors.

The screen defaults to an ink colour of white, but other colours can be used. Pressing one of the number keys changes the colour of the cursor and the lines that it draws. The instructions say that all 16 MSX colours are available, but as you can only use keys 0 to 9, we can't see how this can be true.

Fully enclosed shapes such as circles and rectangles can also be filled with colour, as long as the fill colour is the same as the border.

Other features offered include dot drawing, a slow but useful erase facility, and the ability to write text on the screen (although, apparently only in white).

But we did come across a few problems. For one thing, the cursor responds fairly slowly to pen movements, resulting in a certain sloppiness. And occasionally it seemed to have a slight hiccup — drawing a diagonal against a ruler sometimes resulted in a bent line.

Colours often bleed into each other giving jagged edges and, once or twice, blotched lines. However, this problem has more to do with MSX screen handling than with the Grafpad.

One plus is that the resolution of the tablet matches that of the screen. The tablet surface is divided into a grid of 16 × 20 boxes, each of which has an effective sensing grid of 16 × 16.

This gives a resolution of 320 × 256. Only a part of this is used with MSX micros as their screen resolution is only 256 × 192. The rest of the tablet surface can be used as a software-defined menu area. There is also a specially marked menu area on the right hand side of the tablet which is software definable.

As a drawing and graphics implement, the Grafpad does not match the Sanyo light pen. The latter has far more features for less money and is easier to use.

However, most of the Grafpad's shortcomings are in the supplied software, rather than the hardware. The point is, it's a versatile peripheral which you can program for you own applications.

The software supplied is in BASIC, so it's easy to LIST it and see how it works. In addition, the instruction book contains a sample program with all the essential routines.

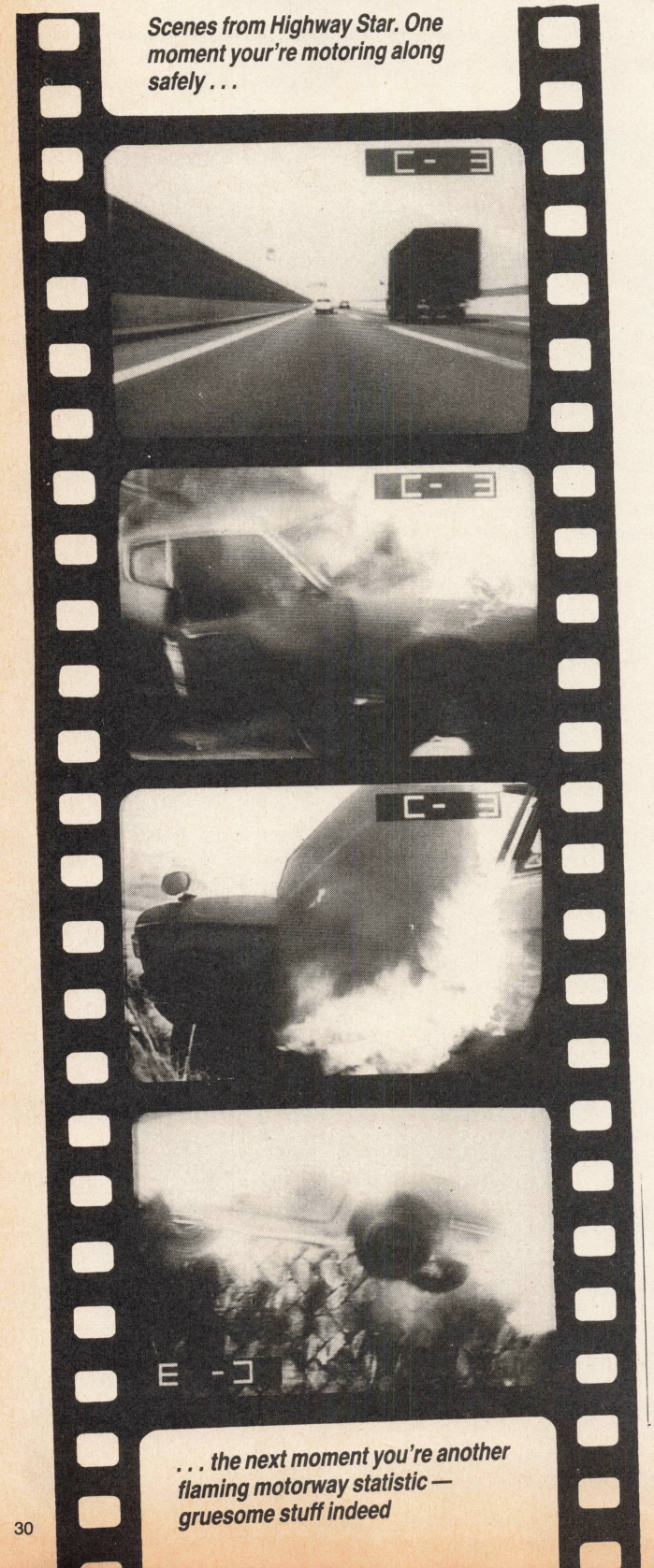
Earlier versions of the Grafpad, produced for other micros, are being used for everything from stock control to keyboards for handicapped children. And this sort of specialist use is where it earns its cost.

DRAWING FEATURES

N	**Re-New (clear) screen**	**F**	**Fill area with colour**
R	**Draw a Rectangle**	**P**	**Draw a Point**
C	**Draw a Circle**	**0-9**	**Select colours**
T	**Draw a Triangle**	**W**	**Write text**
L	**Draw a Line**	**K**	**Keep (SAVE) a drawing**
D	**Draw freehand**	**G**	**Get (LOAD) a drawing**
E	**Erase part of a drawing**	**H**	**Hardcopy**

PLAYING FOR REAL

Steve Mansfield reports on JVC's latest video disk technology



Scenes from Highway Star. One moment your're motoring along safely . . .

. . . the next moment you're another flaming motorway statistic — gruesome stuff indeed

It was another rainy day in Brent Cross. Miles of motorway unfolded in front of me as I eased back into the seat and prepared for another fast drive. It wasn't the most inspiring sight, but at these speeds you have to stay alert.

Suddenly a barrel appeared from nowhere, tumbling through the air in front of me. Instantly, I switched lanes only to find the driver in front of me didn't share my love of speed. The last thing I saw as I smashed into the back of him was my own car exploding into flames.

Fortunately, I'd only lost one life, and my game of *Highway Star* wasn't quite over.

This action all took place in JVC's North London headquarters. But it was no ordinary computer game. *Highway Star* is one of several titles which make use of interactive video, running via an MSX computer.

The system I looked at, and the software it runs, are very much Japanese, and there are no plans to sell the equipment here at the moment. But after hearing people talk so much about interactive video, it was interesting to see it actually working.

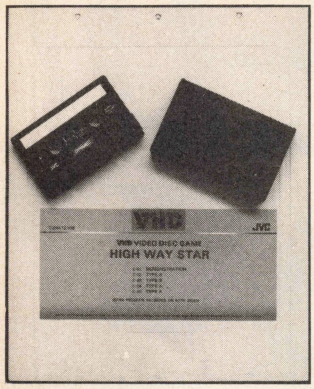
The system I saw consists of a JVC HC-6 micro, a cartridge-type adapter and a BD-7550 VHD video disk player. The micro also needed the addition of another interface, which is also missing on the British HC-7 model. But JVC's next micro — the HC-8 — should have these bits built-in.

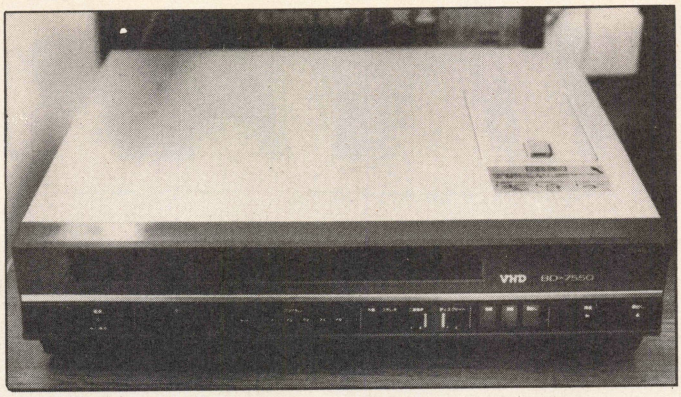
The video machine is a standard model but, once again, it's not on general sale in this country. JVC was going to launch the system a couple of years ago, but decided against it on the grounds that there were too many video formats around already. VHD uses a stylus rather than a laser to read the disk, which means that a disk can wear out eventually. This was apparently a problem British Leyland discovered when it used an interactive video system at an exhibition.

The computer was used to demonstrate its cars. Unfortunately, everyone just wanted to see the more powerful ones, like the XJS, and that section of the disk soon wore out.

So much for the hardware, what about the games? Well, they certainly are impressive. In *Highway Star* you see the view through the windshield of a car as it zooms down a

A scene from the golf game — **Birdie Try**





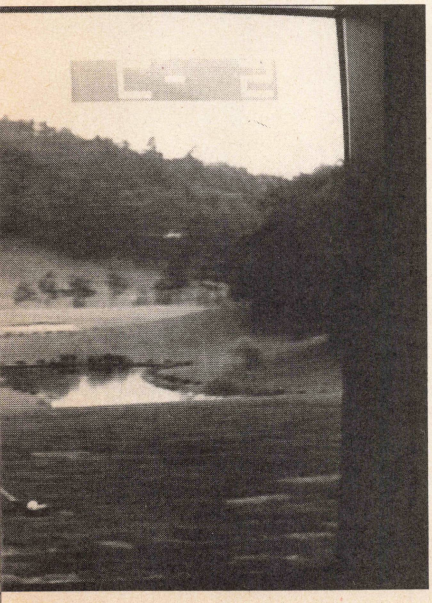
Above left: To give you an idea of size we have a standard cassette and cartridge lying on top of a VHD video disk. Above right: The VHD player isn't generally available in this country yet

motorway. The only controls you have are LEFT and RIGHT (cursor keys or joystick), which are used to switch lanes. This is necessary because you have to avoid slower cars in front of you and oil drums which come spinning out of the sky.

The game's designer didn't scour Japan looking for a stretch of motorway plagued by showers of oildrums. Instead the drums are created by computer graphics and superimposed on the video image.

In fact, they're fairly crude. Simple designs are faster to animate, so the drums have probably been kept crude in order to achieve real-time movement.

Should you hit a drum or another car, you're treated to a video sequence of a car exploding into flames, including a few close-up shots. There's no doubt that it is dramatic and effective. But I was a little disturbed at the idea that motorway accidents are fun.



The image of the motorway zipping past is quite exciting. This is especially true when you switch lanes only to find yourself closing rapidly on the back of a 40-tonne truck! It's not a game for people prone to heart failure.

As well as the stunning visuals, you're also treated to excellent stereo sound. There is, of course, no need for special speech synthesis modules when you can take sound straight from a video recording.

Several other interactive video titles use this to good effect — for example, the educational program *Alice in Chemical Reaction Land*. This employs real-life film footage, computer graphics and artwork animation to teach chemistry.

Other titles I glanced at did not have such noble or serious intentions. *Vroom!* is a motorbike game where you have a lot of control over the speed and direction of a scramble bike.

And apparently there is a gambling game where, amongst other things, you have to decide whether an alien monster is going to go into the Gents or Ladies!

One game I really saw in depth was a golf simulation, which rejoices in the name of *Birdie Try*. It's a good demonstration of how interactive video games are put together.

The game starts with a short piece of film showing the flag on the green. This tells you the direction of the wind.

You then get a computer graphic diagram of the hole (there is only one). A line drawn from the current position of your ball waves around, and hitting a key fixes the direction of your next shot. The line then gets longer and shorter, representing the power of the shot, and again you select your final shot by hitting a key.

Once you've done that, the machine switches to video and you are shown a golfer playing the shot you've selected.

The program's makers must have shot thousands of short film sequences because not only do they have to cover all the locations on the fairway and green, but they have to provide a variety of shots from these locations, including things like obvious slices.

The sequences are stored in lists on the disk. In *Highway Star*, for instance, all the crash sequences are in one area of the disk.

Except when teeing off or putting, you are given a choice of two or three clubs. And once you are on or near the green, the computer diagram shows just this part of the course, making for greater accuracy in your choice of direction.

Once you've managed to sink the ball, or get it so close that sinking it is inevitable, you're greeted with the message *CUP IN!!*, and the computer prints your score card.

It's good fun, and the presentation is very slick — in fact, in some places it's too slick. The opening video sequence, with its split-screen image of a golfer, looks like the opening of a particularly bad American TV sports programme.

But to compensate for that, there are some very cute touches. A couple of times I hit the ball into the trees, and was left in no doubt about how bad the shot was when the screen showed my ball hitting and bouncing off a tree, in agonising close-up.

There are also several shots of balls landing in water on the disk, as well as sequences of the golfer completely mis-hitting the ball. That happens when you select a low power setting while in the rough.

When you putt, the video sequence shows both a general view and a close-up inset, so you can see just how good or bad the shot was. It's a shame there's only one hole. But considering how many film sequences are needed for that one, it's not surprising you don't get the whole course.

The number of sequences also helps to push the price up. Shooting video isn't the cheapest of occupations. An unconfirmed rumour suggests that the BL demonstration disk, mentioned earlier, cost something in the region of £¼million.

You won't find many back bedroom operations producing interactive video games, like you do with current computer games. The cost of production and the need for different skills will mean that only the larger companies, who are probably involved in video production already, will get involved.

The hardware itself isn't that expensive. Video disk players sell for as little as £200 to £300. But the software medium isn't cheap, and on top of the cost of production, this would probably help to keep the price of games high.

When MSX starts to realise its mass potential in this country — that is, whan a lot more people buy MSX computers — JVC might change its mind and market the VHD video system here.

That's because it could sell to two markets — computer games fans and people who want to watch movies. And other companies, like Pioneer, also have interactive video systems on the horizon. But for now, it's still just out of reach.

COMPETITION

GET IT TAPED!

De-bug our listing and win a data recorder

Fed up trying to load your software with the hi fi? Can't get the volume just right on your stereo cassette player? No problem! Just brush up your BASIC, put pen to paper and enter this month's simple competition.

Be one of the first 10 winners out of the hat and you'll win a great Binatone data recorder — we know it's good because we reviewed it in the May issue. Just think, no more lugging equipment from room to room, plugging in and disentangling all those leads. . . .

All you have to do is take a look at this listing. As you've probably noticed already, it's bugged. *Very* bugged. There are 10 mistakes in all, each on separate lines of the program. Just make a note of the line number of each incorrect line, write them down on a postcard and send it to us at MSX Computing, 38/42 Hampton Road, Teddington, Middlesex TW11 0JE to arrive by the 11th June.

RULES

1. The judges' decision is final and no correspondence will be entered into.
2. No employees of Haymarket Publishing or Binatone or their families may enter.
3. The winners' names will appear in the August issue of *MSX Computing*.

WINNERS

Here are the six winners of our April Robot competition: Alistair MacRae, Inverness; Paul Lockwood, Market Weighton; Trevor Davies, Huddersfield; L Nasse, Stockport; G Dewar, Dunfermline; Elizabeth Waters, Havant.

The correct answers were 1) R2D2 and CRPO; 2) K9; 3) Marvin; 4) Zero or Zeroids

Congratulations to the winners, whose ideas for computer control ranged from a children's safety device to controlling an aquarium shop.

```
10 SCREEN;2
20 CLS:COLOR116
30 LINE(30,30),(230,150),4,BF
40 OPEN "GRP" AS #1
50 FOR N%=1 TO 3
60 READ X%,Y%
70 PSET(X%,Y%
80 FOR M%=1 TO 20
90 READ CH%
100 PRINT#1:CHR$(CH%);
110 NEXT
120 PRINT#1,""
130 NEXT
140 GOTO 140
150 DATA40,40,32,32,32,,32,77,83,88,3
2,67,79,77,80,85,84,73,78,71,32,32,32
160 DATA40,60,84104,101,32,109,97,103
,97,122,105,110,101,32,102,111,114,32
,97,108,108
170 DATA40,80,77,83,88,32,99,111,109,
112,117,116,101,114,32,117,115,101,11
4,115,46,32
```

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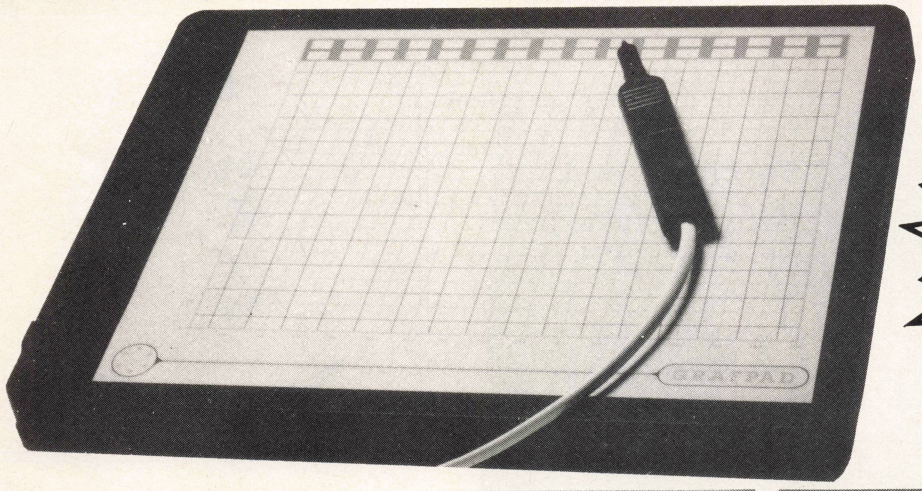

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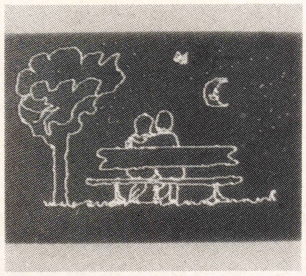

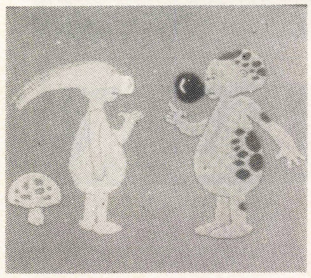

The MSX GRAFPAD is a TRUE graphics tablet. It is a unique British invention unequalled in the world of Graphics Input and combines in one device the features of mice, joysticks, touchpads, light pens etc. The applications are as numerous as that other commonly held device — A PEN! — and include:

- ★ Option Selection
- ★ Form Input
- ★ Data Collection
- ★ Logic design
- ★ Picture creation
- ★ Picture storage
- ★ Picture retrieval
- ★ Construction design
- ★ Text Illustration
- ★ Games
- ★ Pattern Design
- ★ Education

HARDWARE

Resolution	:	± 1 pixel on display	Dimensions	:	H-2.5cm W-35cm D-26cm
Accuracy	:	± 1 pixel	Working Area	:	24cm × 19cm + Menu
Repeatability	:	± 1 pixel	Weight	:	0.8 Kg (Tablet) 1.2 Kg (Gross)

SOFTWARE

Basic software is included FREE with each GRAFPAD and as a minimum allows picture generation (lines, circles, rectangles, ellipses triangles), filing and retrieval, printing.

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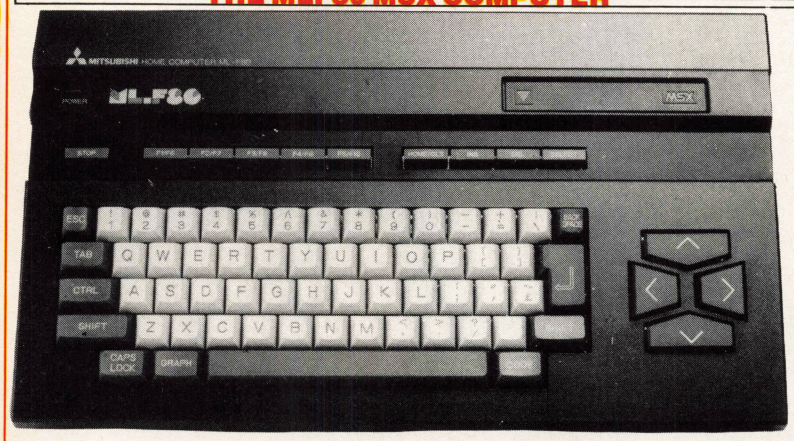

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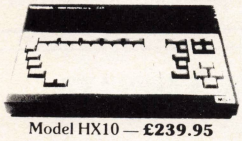

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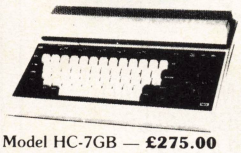

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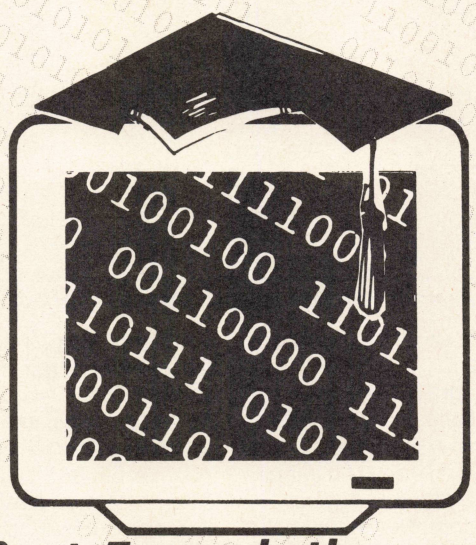


Part 5 – printing out

Last month we looked at a simple program to print a message onto the screen. We also discussed the addressing modes used in the program, and left you with a mystery program to examine.

Did you work out what this program does? It was a bit unfair, really, as we used a subroutine in the BASIC ROM called CHGET, which we haven't explained yet.

The action of this subroutine should not be that difficult to figure out, though, as we already know what CHPUT does — it prints a character on the screen. So it seems likely that CHGET reads a key on the keyboard and returns its value to the program. And this is just what it does, but we have to be a bit more aware of *exactly* what it does before we can safely use it.

CHGET will read the next character typed in and return its internal code in the A register. The MSX computer keeps a 'buffer' in its memory called the 'keyboard buffer', and this allows us to type ahead of the computer reading.

If we call CHGET when there are characters in this buffer, the first one entered is removed and returned as CHGET's result. If there are no characters there, CHGET will wait forever until a key is finally pressed, and returns this as its result.

One thing CHGET doesn't do, though, is to *echo* the key pressed on the screen. Echoing means printing the key pressed on the screen as it is pressed. On the other hand, if you use the BASIC statement INPUT, you will see everything you type appear on the screen, because this command does echo its input.

You will find that it's often useful for input to machine code programs to be echoed on the screen, and this is what out little program does. We have printed the program again in Figure 1 for those who missed it last month.

There are two important things to notice in the program; the HL register pair is loaded with the address of a block of memory called BUFFER and the C register is loaded with 30.

Why are these things important? Let's look at the rest of the code. After loading C with 30, we enter a loop starting at the LOOP1 label. The first thing we do inside this loop is to call CHGET, which will return with a character in the A register.

To echo this character, we immediately call CHPUT. This prints the character out onto the screen, but still leaves its code in the A register.

Next we use register indirect addressing to put the character read into the buffer: LD (HL),A.

To make HL point to the next location in the buffer we must add 1 to it, which is what INC HL does. We then subtract 1 from the C register with DEC C. If this makes the C register hold 0, the Z80's zero flag will be set. If C is not 0, the zero flag will be reset.

This is important to the next instruction, which is a relative jump controlled by the zero flag. We are testing for the zero flag being *reset* here, JR NZ, so the loop will be executed continuously until C becomes zero. When this happens, we will have read 30 characters into the buffer, and each one will have echoed onto the screen.

The two instructions

```
LD HL,BUFFER
LD C,30
```

are important because the first determines where the characters read-in will go, and the second determines how many characters will be read.

What we should really do, of course, is to use the C register as an indicator of the *maximum* number of characters we want to read, and use some character read in to terminate input. We could check for a line feed or a carriage return, for example, and finish reading input when we meet this character.

While we're talking about carriage returns and line feeds, we should take a closer look at their effects. Neither is a true 'new line' character, as the first simply sends the cursor back to the beginning of the current line, while the second moves the cursor down one line.

To get a new line effect, then, we need to print a carriage return followed by a line feed. We'll tackle this a little later.

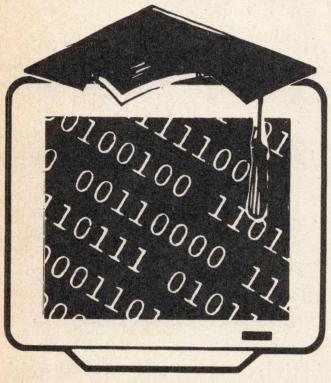
Our program does not end with reading characters into the buffer, though — we've added a bit more to make it print out the message which we've typed in again. The action of this bit is fairly similar

to the program we examined last month, except that it uses the C register to count down the number of characters printed, rather than looking for a byte of zero.

There is a new instruction here, too. It's the assembler directive DEFS, which stands for 'define storage'. This directive is followed by a number (30 in this case) and reserves that many bytes.

Values are not put into the reserved area, so we must not assume that it is filled with zeros or whatever. It simply reserves some memory space which we can use for buffers and other data storage areas.

If you type this program into your assembler, assemble it and then call it from BASIC with USR, you'll find that it seems to be doing nothing. It's waiting for you to type in some characters, of course, and it will continue to wait until you



'A 16-bit number can be between 0 and 65535 if we are not using two's complement'

have typed in 30 of them. It will print what you have typed immediately afterwards. At the moment it doesn't look very neat because we haven't printed any line feeds or carriage returns.

Printing and reading messages is not all we can do in machine code, so let's start looking at some more useful programs. Suppose we wanted to read in a decimal number from the keyboard and convert it to hexadecimal (base 16), then print out the result to make sure that it's been done properly. The program to do all this is shown in Figure 2.

```
CHGET:  ORG     #C000
CHPUT:  EQU     #009F
LF:     EQU     #00A2
CR:     EQU     10
        LD      13
        LD      HL, BUFFER
LOOP1:  CALL    C,5
        CP      CHGET
        JR      CR
        CALL    Z,CONVERT
        LD      CHPUT
        INC     (HL),A
        DEC     HL
        JR1     C
CONVERT:LD      NZ,LOOP1
        LD      IX,BUFFER
        LD      HL,0
CLOOP:  LD      A,5
        CP      C
        JR      Z,CEND
        INC     C
        PUSH    BC
        LD      A,(IX+0)
        SUB     "0"
        PUSH    HL
        POP     DE
        ADD     HL,HL
        ADD     HL,HL
        ADD     HL,DE
        ADD     HL,HL
        LD      B,O
        LD      C,A
        ADD     HL, BC
        INC     IX
        POP     BC
        JR      CLOOP
CEND:
        LD      A,CR
        CALL    CHPUT
        LD      A,LF
        CALL    CHPUT
        LD      A,H
        CALL    TOHEX
        LD      A,L
TOHEX:  PUSH    AF
        AND     #F0
        SRL     A
        SRL     A
        SRL     A
        SRL     A
        ADD     A,"0"
        CP      ":"
        JR      C, NOTLET
        ADD     A,7
NOTLET: CALL    CHPUT
        POP     AF
        AND     #F
        ADD     A,"0"
        CP      ":"
        JR      C,LETNOT
        ADD     A,7
LETNOT: JP      CHPUT
BUFFER: DEFS    5
```

Figure 2: Reads in a decimal number, converts it to hexadecimal and prints out the result

This program has three main sections; the first reads in the number from the keyboard and doesn't differ all that much from what we've written before. Notice that as well as decrementing C, we check for a carriage return (CHR$(13)) being entered. This corresponds to the ENTER key.

Why do we limit ourseives to a maximum of five characters? Remember that we are reading in a decimal number here. The easiest sized number to deal with would be 8 or 16 bits long, and we've chosen 16 bits here.

Remember a 16-bit number can be between 0 and 65535 if we are not using the two's complement convention. As 65535 is the largest number we can deal with, and it has five digits, it follows that all the other numbers we can represent in this number size cannot have more than five digits. By limiting ourselves to five digits, then, we are making our job easier.

Although you will still be able to enter numbers between 65536 and 99999, the values calculated for these numbers will be taken as *modulus* 65536. The modulus is the remainder after a division, so 65536 modulus 65536 is 0, 65537 modulus 65536 is 1, and so on.

Once our number is read in we need to convert from the sequence of characters typed, to the number it actually represents. This bit is possibly the most complicated stage of the program.

Start here

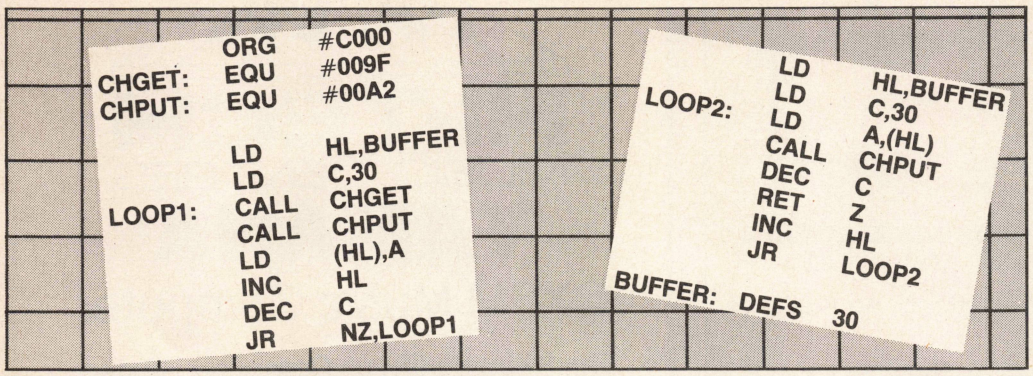
The code starts at the CONVERT label, and immediately uses an instruction which we have not met before. This is LD IX,BUFFER. This is analogous to loading HL with the address of the buffer, but we are using one of the index registers (IX and IY) instead.

We're going to put the value of the number into the HL register pair, so the next thing we need to do is to clear HL by loading it with 0. Then we enter a loop starting at CLOOP.

This loop first checks whether we've looked at all the characters read in. When the program reaches CONVERT, we can work out exactly how many characters were read in by subtracting the value of the C register from 5.

Rather than performing the subtraction, which would involve a few register exchanges, we load A with 5 and compare this with C. If the result of the comparison sets the zero flag, we must have processed all the characters, so we jump to CEND. If we haven't done so, we increment C and save it on the stack with the PUSH BC instruction.

Now we get a character from the buffer, pointed to by IX. But look at the instruction: LD A, (IX+0). This is known as *indexed indirect* addressing. It works out where to find its operand by adding the *offset* specified in the instruction (which is 0 here) to the index register (IX here),



```
CHGET:  ORG     #C000
        EQU     #009F
CHPUT:  EQU     #00A2

        LD      HL,BUFFER
        LD      C,30
LOOP1:  CALL    CHGET
        CALL    CHPUT
        LD      (HL),A
        INC     HL
        DEC     C
        JR      NZ,LOOP1

LOOP2:  LD      HL,BUFFER
        LD      C,30
        LD      A,(HL)
        CALL    CHPUT
        DEC     C
        RET     Z
        INC     HL
        JR      LOOP2

BUFFER: DEFS    30
```

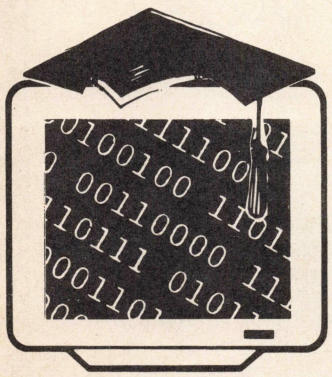
Figure 1: Echoes your machine code input on the screen

and indirecting through that address to get the byte we want. This is the virtue of the two index registers; they are the only ones which can have a constant offset in the instruction like this.

Now we subtract the internal value of '0' from the character to give us the number it actually represents, and then multiply HL by 10.

Although it looks complicated, the multiplication is actually quite straightforward. We load DE with the same value as HL by pushing HL onto the stack and popping DE off. This is a common trick and well worth remembering.

Now that DE and HL hold the same value, the multiplication is easy. We first multiply HL by 4 by adding it to itself twice, and then we add in DE to make HL hold 5 times its old value. Finally we double this by adding HL to itself again. After this little operation, HL holds 10 times its original value.



'We start a new line by printing a carriage return (CR) followed by a line feed (LF)'

We must now add the contents of the A register into HL, but as HL is 16 bits long and A is only 8, we have to go through BC to do it. We clear B by loading it with 0, and then put the value of A into C. We can now add HL and BC to leave us with the total in HL. As you can see, HL is our *accumulator* which is gradually receiving the total value of the number we typed in.

The last few stages of the loop increment IX to point to the next character in the buffer and retrieve the old value of C from the stack by popping BC. Then we jump back to the start of the loop again.

Tidying up

When this process is completely finished, HL holds the real value of the number which we typed in. Now we need to convert this to hex digits and print it out to the screen. We do this with the code starting at CEND.

To keep things neat and tidy, we start a new line on the screen by printing a carriage return (CR) followed by a line feed (LF). We take the highest byte of our number, which is held in the H register, and call a routine called TOHEX to print out the two hex digits this represents.

When this returns, we put the lower two digits, contained in the L register, into A and print these two out. Notice that this time round we don't call TOHEX, we simply enter it. In this way, the last instruction will cause us to return to BASIC straight away. It saves a couple of bytes on instructions, you see!

TOHEX itself is a 'standard' routine, which means that everyone writes it in the same way.

We save the number on the stack by pushing AF, then isolate the top four bits (the 'high nybble') by anding with #FO (240). As a nybble represents one hex digit, we know that this leaves us with the value of the digit we want to print multiplied by 16.

We divide by 16 with the four SRL A instructions. This stands for 'shift right logical', and simply shifts the 8 bits in the A register one place to the right. By doing it four times, the net effect is to divide A by 16. This leaves us with a number between 0 and 15 in A, which we now need to convert to a printable digit.

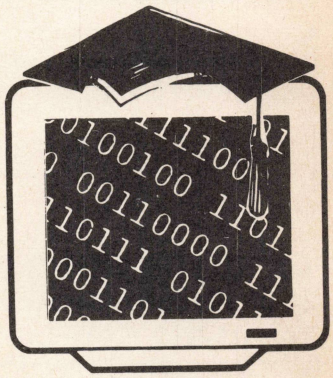
We do this by first adding the code for '0' to the number. If the number was greater than 9, then we actually need to print a letter from 'A' to 'F' rather than a digit. We check this out by comparing the value of A with the code for the colon, ':'.

This code immediately follows that of '9' in the character set, so if the original number was between 0 and 9 the compare instruction will set the carry flag. This is because the comparison is actually a subtraction, and subtracting a number from a smaller number results in a 'borrow', which is represented on the Z80 by the carry flag.

If the carry flag was not set by this instruction, we add 7 to the A register, which brings up the character value to the requisite 'A' . . . 'F'. Then we call CHPUT to print it out on the screen.

To produce the other digit, we pop AF back off the stack and AND it with #F (15). This leaves us in the same state as we were after we had divided the higher digit by 16, as it should be. After all, it's obvious that if we are working in base 16, each digit must be worth 16 times as much as the one to the right of it. In the jargon, we say that each digit is 16 times more *significant* than the previous.

Notice how the last instruction of the program, and therefore of the TOHEX subroutine, is a JUMP to CHPUT rather than a CALL. This is just another space saver, as we could equally CALL CHPUT and then RETurn out of TOHEX. This would make the program a byte longer.



'Try and make a habit of being space conscious when you are writing programs

If you think about it, you'll find that our method achieves exactly the same effect with its one JP instruction as the alternative

```
CALL . . .
RET
```

instruction pair does. Try and make a habit of being space conscious when you are writing programs.

The end result of this program is that all four hex digits of our number are printed out on the screen. We can enter any number between 0 and 65535, resulting in answers of 0000 to FFFF.

We could make the program much more efficient by using more routines built into the MSX ROM, and by using a new and very powerful instruction — DJNZ. More next month.

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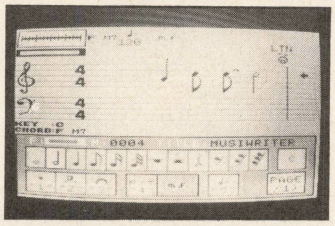

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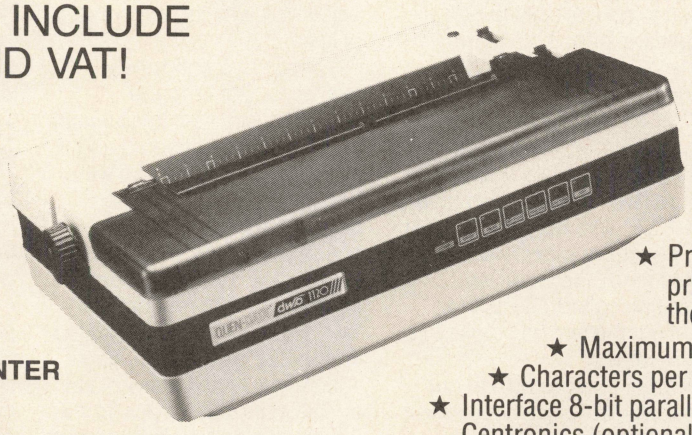

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GOING FOR GOLD

Adventure, maze and arcade adventure — that's The Wreck

A a few weeks ago, we managed to get our hands on a pre-release version of a new game which we can only describe as different. It is called *The Wreck* and is the brainchild of software house Electric Software.

It's an adventure based on — yes, you guessed it — a sunken shipwreck. But it's an adventure with a difference.

For a start it's three dimensional, and furthermore there's no text — it's purely graphics. 'I suppose you could describe The Wreck as a second generation graphics adventure' says Electric Software's Mike Hall.

Each copy of the game will be supplied with a manual and a special location grid, both 'essential reading' before you set off.

The manual provides a potted history of your recent meeting with a drunk in a bar, which ends up with your collaborating and diving to the wreck of the 'Beaulieu Anne' to search for gold bullion.

The opening screen has you just outside a hole in the side of the wreck, waiting to climb through. You have nine full air tanks there, including the one strapped to your back.

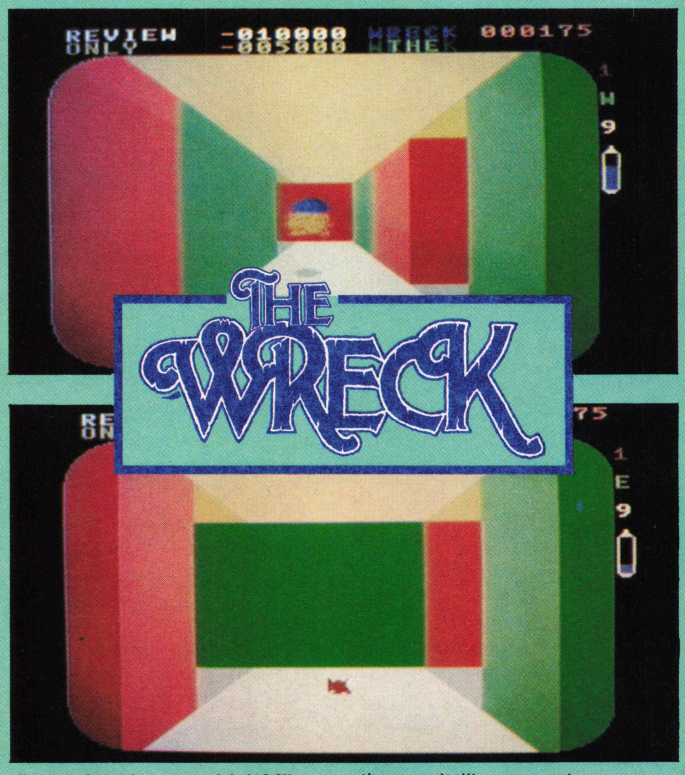
The view you see on the screen is what you see through your face mask, with various bits of information around the edge of the screen such as your score, the amount of air you have left, and the floor you're on and the direction in which you're facing.

Your goal is to collect the gold which the captain of the ship had hidden in a safe on the bottom deck of the ship just as it was going down.

And that, dear readers, is easier said than done! The game's designers, Andy Eltis and Jake Dowding have spent the last year writing the game, making it *extremely* complex.

They have scattered clues all over the ship. You, of course, have to find them all. Once you've found all the clues on the first deck, you have the combination to the safe there, which in turn will give you the necessary information for tackling the next deck down.

Each deck appears in the form of a maze. The first is a fairly straightforward, three-dimensional maze which Mike reckons the average adventurer should be able to crack in about four hours.



On the other two decks things get just a little bit more involved. The mazes here are non-linear; that is, if you leave a location going eastwards and turn round to go westwards, you won't necessarily end up where you started. This is why the location grid is essential and should be kept to hand.

If you think that's enough, then wait till you see the graphics. They are pretty impressive, with realistically scrolling walls as you move along the corridors, and fast moving friendly and hostile sea beasties.

Needless to say, you are living very close to the edge down there, what with huge octopii flinging you around, your oxygen running out and continually getting yourself lost.

Electric is launching *The Wreck* on cassette first followed shortly by a cartridge version using the new Chip On Board (COB) technology the company has been developing for the past 18 months.

COB (as Electric affectionately calls it) involves taking the silicon wafer out of the chip and fusing it onto the pcb, rather than soldering the complete chip onto the board.

This whole process means that the circuitry is considerably condensed, making the end product neater, more compact and hopefully, cheaper to the end user.

'What we've done,' says Mike, 'is to take the brain out of the body and throw the body away, in other words we've got rid of the unnecessary housing'.

What alll this means to you is that Electric will be turning out good quality games cartridges for the same price as its cassettes (ie £14.95 for *The Wreck*).

Eventually, ie by the end of the year, Electric expects to drop the price to around £12 which will be even better value for money.

But what about *The Wreck* . . . ? We'd love to tell you more but Electric is planning a competition based around the game so the pre-production copy we have has been 'fixed': several vital clues have been deleted so that we can't give the game away!

Each copy has details of the competition contained within the game. Electric hasn't set a closing date but Mike anticipates that it will be some time around Christmas.

To win the prize, which is a solid gold ingot, you have to solve the adventure which Mike believes will take you the best part of six months!

And here we can give you a tiny hint. Inside the safe with the bullion there's an egg containing an alien. As you start to remove the bullion it hatches. 'There's only one person in the company who knows what the alien looks like,' is all Mike would say.

The catch is that not only do you have to solve the adventure, but you also have to notch up a high score and send in an artistic impression of the alien. Let us know how you get on!

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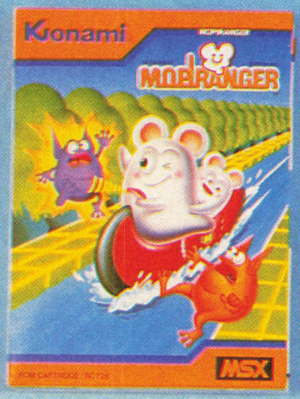

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REVIEWS

PRINT

Tear your eyes away from that screen and scan this month's book reviews courtesy of Simon Craven.

Public Computer Systems
by Alex van Someren
Century Communications, £4.95

Another book timed to meet the upswing of interest in telecomputing and the security risks created by unauthorised users is this first volume in Century Library of Technical Information series.

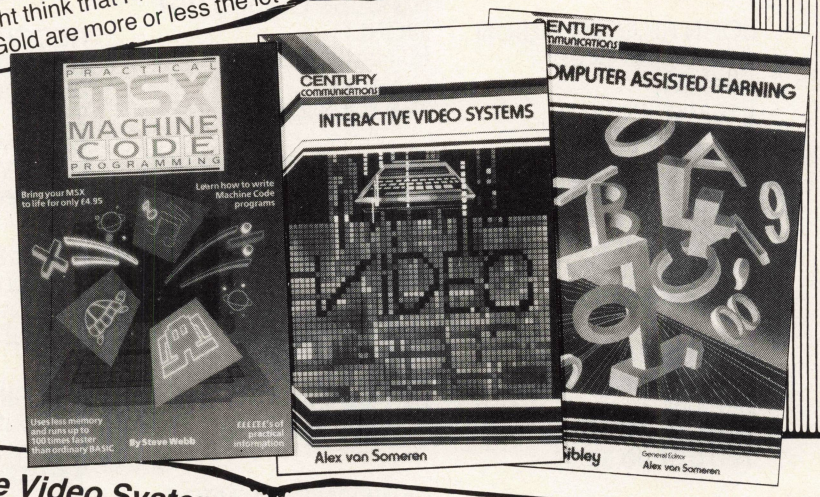
Like the other books in the series it concentrates on getting the most information over to the reader in the smallest number of words possible, and one can quite imagine hordes of Fleet Street reporters hastily thumbing through it as they bash out the latest hacker scare story.

It isn't really a 'how to do it' book like John Newgas' *Talking to the World*, (though one chapter does give some help with how to go about logging on) but more a guide to what's available in the public computer world.

You might think that Prestel and Telecom Gold are more or less the lot in this country, but much more is available through packet switching systems and broadcast viewdata. The main areas and features of the different public computer systems are explained including the rather surprising fact that Telecom Gold, a hard-nosed business system if ever there was one, has a comprehensive games section!

In a successful effort to avoid alienating users of various kinds of computer, the author avoids tying the text into machine-specific details. You can get plenty out of the book whatever system you use.

Public Computer Systems offers a useful introduction to the subject, but it is hard to see who it is aimed at. If you want to get your hands dirty and involve yourself in telecomputing, *Talking to the World* offers more practical help, but as a source of information to refer to occasionally, this book is more than adequate.



Computer Assisted Learning
by Martin Sibley
Century Communications, £4.95

This slim volume is part of a Century Communications series called the Library of Technical Information.

Its main concern is the use of computers in schools, and inevitably, much of its emphasis falls on the BBC Micro and associated equipment. This is understandable given the heavy usage of the BBC machine in British schools, but the government-sponsored MEP scheme is far from being the only influence on educational computing, and parts of the book, like a 20-page attempt to summarise BBC BASIC, seem rather tangential to the main thrust of the book.

The bulk of the rest of the book is taken up by a description of two other languages, PILOT and the turtle

Interactive Video Systems
by Alex van Someren
Century Communications, £4.95

The author defines interactive video as a system by which visual information is stored on tape or disk, under sophisticated control from the viewer via a computer. Potentially this kind of system is very powerful and important, and van Someren provides a useful background to the hardware involved and its potential applications.

The book is divided into four major sections. The first, *Background*, describes the nature of the subject and introduces the vocabulary and techniques of interactive video *Technology* describes the nuts and bolts of how the video and display elements work, and gives details of rival systems. This is possibly the most interesting part for a home computer enthusiast, especially ones who like fiddling with machines in general.

Computer Technology introduces the ways in which computers can be interfaced to the video system, and in recognition of the wide level of computer literacy these days does not delve too deeply into computer fundamentals.

Applications looks at the ways in which interactive video can be used, and looks into the future to predict how it will affect everyday life.

Interactive Video Systems is crisply written and well illustrated, but like the other books in Century's Library of Technical Information seems a little expensive. Nor is it particularly technical — from the series title, you might expect a heavyweight tome full of technical terms, but instead the book is aimed at the non-technical reader and uses good old-fashioned plain English to put its message across. Well worth a look if you need an inexpensive, easy introduction to the subject.

Practical MSX Machine Code Programming
by Steve Webb
Virgin Books, £4.95

Try as you might, there are some things you just can't do in MSX BASIC, and sooner or later every programmer has to resort to machine code to get around the restrictions of high level languages. However, it is not an easy subject to grapple with, especially as the easy readability of BASIC is lost, and many books on the subject seem aimed at readers with a high level of technical knowledge.

This book is definitely aimed at the MSX user in the street, if there is such a person, and restricts the scope of its coverage very tightly in order to cover a few areas in terms any BASIC programmer can understand. The machine code purists who see this book will scream, but it isn't aimed at them.

T OUT

This latest batch of releases includes two MSX titles and a few non-specific publications of general interest.

graphics of LOGO, and a brief run-down on the MEP educational software appearing for the BBC Micro. Commercial software is largely ignored, as is the existence of any computer other than the BBC Micro and Acorn Electron.

As Sinclair Research, Commodore, Apple, ACT and a number of MSX manufacturers would point out, there are a lot of school computers not funded by the MEP scheme.

The book might be useful as a guide for anyone who wants to know what sort of computing activities are going on in BBC Micro-equipped schools, but it fails to live up to its title. What would have been nice is a discussion of techniques used in the writing of educational software, and maybe some recognition of the many excellent commercial programs available for the many non-Acorn computers in schools. It's not really for general readership.

Talking to the World

by John Newgas
Century Communications, £5.95

Another timely volume to catch the current wave of interest in the hacking fraternity is this guide to logging on by John Newgas, who manages the largest computer bulletin (BBS) in this country.

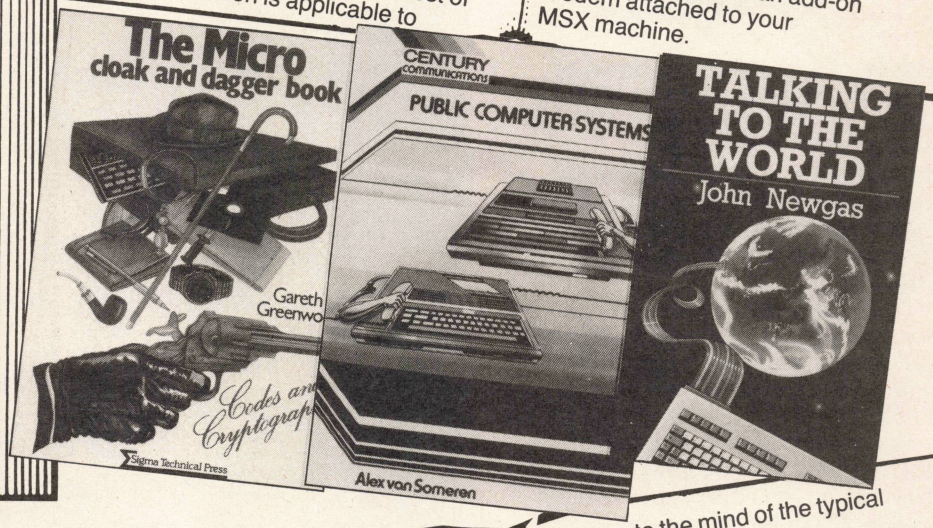
The book is a general introduction to the public databases and bulletin boards available to the UK micro user, and takes the reader from how to choose a modem or a communications program, to sending messages to a friend across town or across the world.

Much of the book is devoted to a technical explanation of how the various components of the system work (modem, RS-232 interface, etc), and a trouble-shooting guide offers some very sound advice on what to do when you can't get through. Most of this information is applicable to problems experienced with many other types of RS-232 peripheral device as well as the modem you're likely to be using.

Other chapters discuss the best way to find your way around various kinds of remote computer systems, the etiquette expected of the user, and running your own bulletin board, a task which is surprisingly within the capabilities of most reasonably competent micro enthusiasts.

A few listings for simple communications programs are included, but the specific computer types catered for in the book are the TRS-80, Atari and BBC Micro, so MSX users will have to improvise or use commercial software.

Nevertheless, this is an interesting and well-written book, worth reading if you have any aspirations to communicating with an add-on modem attached to your MSX machine.



Webb takes the attitude that the easiest way to get the typical MSX user to write a machine code program is to offer machine code equivalents to BASIC statements. The problem with this method is that the reader will start his machine code programming by thinking of a BASIC solution and then translating, cutting out the creative shortcuts which can bring the biggest improvements in execution time.

Although the book teaches assembly language rather than actual machine code (including a number of handy subroutines and a complete Space Invaders program) no mention of assembler/editor programs is made. Instead, all the opcodes are presented with their hex equivalent, and a BASIC hex-loader is used to create the machine code programs.

Worth a look, but we would recommend the study of a more detailed reference text as well.

The Micro Cloak and Dagger Book

by Gareth Greenwood
Sigma Technical Press, £6.95

With the recent surge of interest in computer 'hacking' and other shady applications for a home micro, this fascinating introduction to the mysterious world of coding and encryption is well timed. Starting from basic principles, the book takes you through simple ciphers to the data encryption techniques used by the most secretive government organisations.

Chapter by chapter, worked examples are used along with practice cryptograms (the answers are at the back) to illustrate the mainstream ciphers, and how to crack them. If you have never delved into the field before, you are in grave danger of becoming completely addicted — this kind of thing is very appealing to the mind of the typical computer enthusiast.

As the author points out, with a home computer you have a machine which lets you play with ciphers far more easily than the pioneers who invented the science.

Many computer programs are presented throughout the book to turn theory into practice. The programs are typeset directly from the original Sinclair Spectrum listings so there should be no errors. From the MSX user's point of view, of course, the choice of Sinclair BASIC is inconvenient, but the programs are deliberately made straightforward enough to translate very easily into other BASIC dialects.

As well as providing a good technical grounding in cryptography, *The Micro Cloak and Dagger Book* is written in a clear, absorbing style, making it a good buy for any computer enthusiast.

MSX

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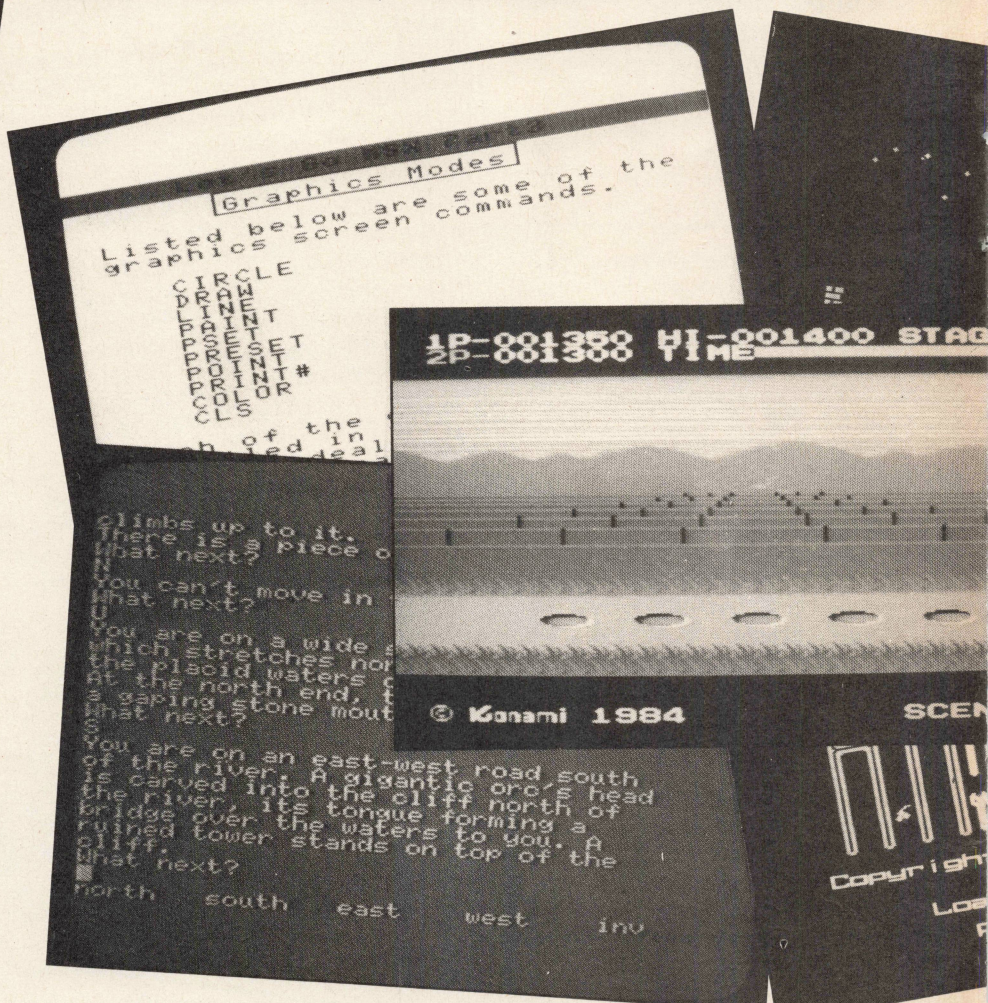

There's gratifying news of some action on the MSX software front. We've heard that a distributor specialising in MSX software is being set up, and that should mean that more programs find their way on to more retailers' shelves.

Meanwhile, and until things get sorted out, so that quality MSX software is available everywhere in Britain, *MSXpress* is here to help you out.

We know that there are lots of good programs in existence but they just haven't been appearing in your local computer stores — to judge by the mail and telephone calls we receive. So, until the industry recognises that MSX is here to stay, we're making top MSX programs available through *MSX Computing*. We're giving you the opportunity to choose from 50 top programs that we've reviewed and liked, or that have been best sellers on other computer systems.

But if you've got a local dealer who's got a good stock of games, we'd **always** recommend you buy your tapes or carts there. After all, a magazine can't give you the chance to give things a trial — and buying direct's a lot quicker than mail order!

Still, if you're stuck miles away from signs of computer life, our *MSXpress* will give you the chance to keep up with the best software around.

On the next page, you'll see a list of the programs available. We've got mind-bending adventures (they've bent ours), wrist-wrecking arcade games, useful utilities and good quality business and educational programs. All you have to do is choose. Study the reviews, read the advertisements then grab your cheque book and post an order off to us. Provided that the Post Office doesn't go on strike, you'll be getting your games within 28 days (overseas applicants should allow two months).

There's something for most tastes in our selection, but if you think there are any glaring omissions, then please write and tell us. We'd also like to know all your high scores, so we can publish a league table.

We're also open to questions about adventures, and hints for other readers on how to solve them. We reckon that adventures are really popular, judging by your response so far, so get those letters rolling in!

A word about the way we've listed the titles on offer. The name of the program is followed by the name of the publisher, the price, a quick description, and the date of the issue in which we reviewed it. The price is all you need to pay — it includes postage and packing (except for overseas readers) and VAT. The price is exactly the same as it would be in your local retailer.

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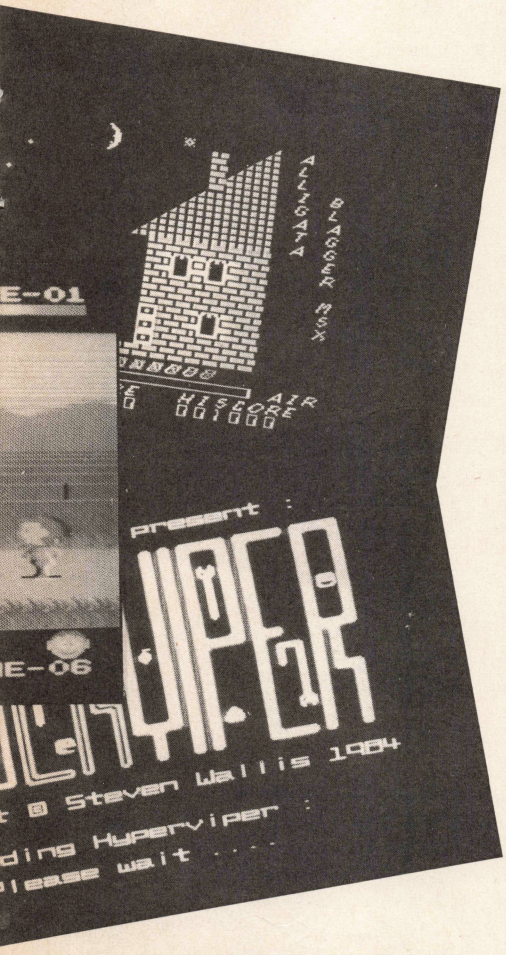

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Software Scene

Our review panel puts all the very latest MSX software through its paces

CRAZY TRAIN

Supplier: Sony (0784) 61688
Type: Strategy
Format: Cartridge
Price: £17.95

Even before plugging in the cartridge we had an idea this little number from Sony was going to be worth playing, its copyright belongs to Konami, king of the cartridge games.

Crazy Train is basically a huge mobile puzzle built out of railway tracks and stations on a square grid. The idea is to successfully manoeuvre your 'crazy' train along the tracks and through all the stations. But as in all good games there are a number of obstacles to overcome!

For a start, a part of the puzzle is missing so you have to keep juggling sections of track by moving parts of the grid around. In this way you make sure the train doesn't de-rail, crash against a dead end or collide with an oncoming enemy train.

The longer you can keep the train running, the more points you'll notch up. For every station you call at, you collect 100 points, and if you manage to stop at all the stations an extra 200 bonus points will be added to your score.

Although the game is aimed at 'youngish children between the ages of 5 and 11', it's quite difficult to play and requires some pretty quick thinking. Every move has to be calculated ultra-quickly otherwise you can easily use up all three lives and find yourself running out of track.

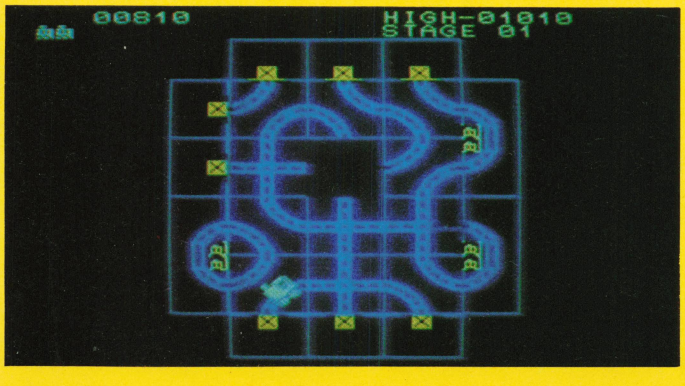
To add a bit of variation to the game you are suddenly thrust into the black of night. The background changes dramatically from a multi-coloured setting to almost pitch black and you need all your wits about you in order to survive the perils of the dark.

After stage three the game becomes decidedly difficult to play and requires more skill and anticipation.

More stations appear on the grid, some in the most awkward of places such as in the centre of the grid, surrounded by dead ends or worse in the middle of a seemingly endless loop.

And, on top of that, two enemy trains appear and try to sandwich you between them!

The trick at this stage is to position the tracks in such a way that the two enemy trains collide with each other.



Strategic planning is the key to success with this game and as there are 43 stages to get through it pays to plan your moves carefully.

On the whole, *Crazy Train* was very impressive and even if Sony hadn't mentioned that Konami played a part in its design you could have easily worked it out for yourself.

For instance, the sound effects are very typical of the company that has made a name for itself with MSX games cartridges.

You get a real chugging noise as the train goes around the tracks, and the whistle is blown at every station.

Although at £17.95 the game is well out of reach of the pocket money brigade, it could be well worth saving up for.

Graphics: *Great*
Sound: *Just like the 11.45 from Paddington!*
User appeal: *Compelling*
Conclusion: *Good all round entertainment*

BLAGGER

Supplier: Alligata (0742) 755796
Type: Arcade
Format: Cassette
Price: £7.95

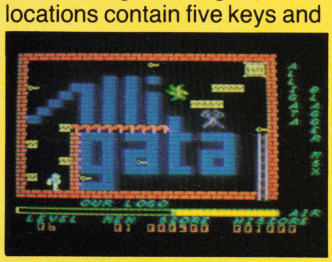
Games like *Manic Miner* and *Jet Set Willy* have become almost legendary because of the unusual locations encountered and the distinctly odd array of monsters that inhabit them. It was inevitable that some of their ideas would filter through to other software houses, with new games being produced in a similar vein.

Alligata's *Blagger* is a game clearly inspired by the Software Arts classics, but has more than enough originality to stand as an excellent game in its own right.

The scope of the game is impressive: there are 20 screens to get through, each with an assortment of weird, wonderful and dangerous

inhabitants. All the locations are named, from the relatively normal *Sweet Shop* and *Bank*, to the positively bizarre and ominous *Help Me Please!*.

A blagger is a thief, and that just about sums up our intent at each stage of the game. All locations contain five keys and



a safe. You have to collect up all the keys and take them to the safe before you can move to the next location.

Unusually, you can start the game at any of the game screens. If nothing else, it gives you an opportunity to browse around and see what you've let yourself in for.

The bank is where you start as a novice. You can move about using the cursor keys or a joystick. Jumping is also made possible by pressing the trigger button.

The designer is very fond of conveyor belts, as you will see as you progress through the screens. In the bank, the nearest key is positioned over a conveyor. Jump for the key, and you land on the conveyor which immediately carries you to your doom.

You find that nothing is quite as straightforward as it seems in *Blagger*. Strategies have to be worked out as you may find yourself in a corner with no possible means of escape.

Until you get used to the style of the game, it proves to be extremely difficult. After hours of key collecting, you realise that getting through all the game's locations is going to take quite some time.

The denizens of the various locations are marvellous. There are vicious prams, disembodied mouths, homicidal sweets and more, and contact with any of them means instant death.

Anyone suffering from software torpor should buy this to spruce themselves up a bit. It's guaranteed compulsive playing until that elusive twentieth screen.

Graphics: *Crazy but well done*
Sound: *Disposable*
User appeal: *People with a strange sense of humour*
Conclusion: *Well worth raiding the piggy bank*

YIE AR KUNG FU

Supplier: Konami 01-429 2446
Type: Arcade
Format: Cartridge
Price: £17.40

Imagine — if you can — the sight of Bruce Lee, King of Kung Fu, flying towards his hapless victim uttering blood curdling screams and landing a well aimed kick at his throat.

If you succeed in conjuring up this image, you've got a pretty good idea of Konami's latest epic game.

You are transported to ancient China at the end of the Ching Dynasty and find the entire kingdom in turmoil. Why? Because the dastardly Chop Suey Triad Gang is terrorising the local inhabitants.

Luckily you just happen to be Lee, a kung fu master and so, anxious to save the world, you penetrate the Bamboo Shoot Pagoda where the gang is hiding out.

That's your potted history. On screen you find yourself clad in nothing but a pair of blue pantaloons facing the first

of the fiends — wicked Wang.

Wang is the big fat nasty-looking character wielding a quarterstaff or bojutsu. Against a backdrop of Chinese lanterns and a row of windows your skills at the martial arts are tested to the full.

Using either a joystick or keyboard you have a number of fighting movements in your repertoire; a straight punch, a high kick, a low below-the-belt kick, foot sweep and most spectacular (and effective) a flying kick.

As well as hitting out physically, you can duck, jump vertically into the air and even jump from one side of the opponent over to the other.

As you fight each other, a strengthometer measures the number of blows you each suffer. Every hit saps the strength and eventually the one who loses his stamina first falls faintly to the floor kicking his legs feebly in the air.

Other opponents facing you are Terrible Tao the flame wielder, Chen the chainfighter, Lady Lan specialist in star flingers and Wily Wu who enjoys flying through the air.

Besides getting points for flooring your opponents, you also notch up marks for the various types of kick, hitting a throwing knife or fire ball and managing to defeat the opposition without getting hit yourself — a useful 5,000 points can be had here.

You begin the game with three lives and after you've scored 3,000 you get an extra one.

Graphic effects are nothing short of brilliant and the body movements as they rush about the floor trying to kill each other are extremely effective and realistic.

Jolly chinese tunes accompany your efforts, punctuated with a realistic thud whenever you succeed in hitting each other.

If you want to see an example of great games programming, buy this game.

Graphics: *Realistic, fantastic*
Sound: *Jolly oriental ditties*
User Appeal: *Not for the faint hearted*
Conclusion: *Buy it at once*

DATABASE

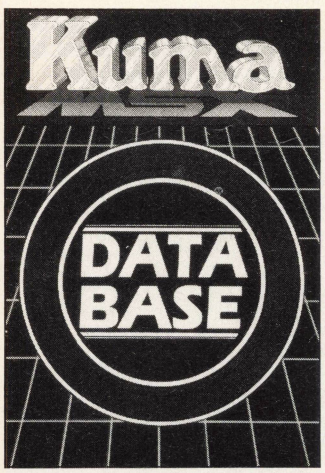
Supplier: Kuma Computers
(07357) 4335
Type: Database
Format: Cassette
Price: £19.95

One thing computers are meant to be very good at is keeping track of data. With a good data management program, they can — so the theory has it — make directories, indexes and files redundant.

This modestly priced package from Kuma may not replace the Encyclopaedia Britannica, but it may come in useful around the home.

Its chief asset is that it is very simple to use. The tape actually contains three programs; a section to load and edit data, a section to design a screen for the inputting of data and a demonstration data framework. A 16-page manual explains how things work.

Loading the edit program



takes about three minutes. You are presented with two screens that explain the various commands. These can be called up any time, so if you misplace the manual you won't be lost.

A file or file framework is then entered. New records can be added after existing records, records can be examined in sequence, or searched for particular words, records can be printed out and the list sorted into alphabetical order.

Compared to high powered business databases, this one is limited by the memory of a 64K MSX micro and the tape storage medium. Recording and loading long files seems to take forever — a disk drive option would be really handy.

As far as the number of files goes, you could store around 200 comprehensive name, address and phone numbers before running out of RAM. At the top of the screen you can see the memory remaining and the program helpfully tells you how many blank records you can use.

On the plus side, the printing-out options are excellent, with facilities for both dot matrix and daisywheel printers. In the normal printing mode, all or just some files can be printed out, including only those that satisfy certain criteria. The print can be as it appears on the screen, or unformatted.

Labels can be printed out too, with some useful options such as type size, multiple copies and so forth. This is the area in which *Database* is strongest.

File searching is not very sophisticated. You can search for a string of characters in a nominated field, but only ahead of your current position, and you'll stop searching at the first match. You can't search for ambiguous strings either.

Moving from record to record in sequence is easy, as is editing records on screen. Moving rapidly through the file is more tedious and if you want to transfer data from one file format to another, you have to re-enter it all.

Sorting entries is fast and overall *Database* is easy to use. As a program to store names and addresses, with label printout, it is excellent. If you want to sort and manipulate data, *Database* may not be sophisticated enough for you. For the non-professional user, it's user friendly and a practical program.

Features: *Good for the price*
Getting started: *Very simple*
Documentation: *Adequate for the program*
Conclusion: *Good for names and addresses*

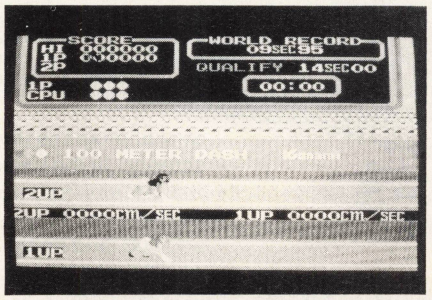
HYPER OLYMPICS I

Supplier: Konami
(0256) 473232
Type: Arcade
Format: Cartridge
Price: £13.99

Does your micro cower in the corner when you enter the room? Does it flinch when you raise your finger? If so, the chances are that you have been playing too many *Track and Field* games lately.

If you don't mind inflicting even more damage on your battered machine, then you could do worse than add *Hyper Olympics I* to your software collection.

With this cartridge, Konami has added another quartet of Olympic events to tax the physiques of digits across the globe.



The aim, as always, is to score points, and you do that by braking world records or simply by achieving the qualification time or distance for an event. The 100 metres starts the games. One signal and it's on your marks, the second and you're off.

Seconds of frantic key pounding follow as you race against the clock. Qualify, and the crowd cheers your success, fail and you are left miserably scratching your head, or sobbing, heartbroken.

Get through this stage and you move to the long jump. This sport requires a good deal of judgement as well as a reasonable sprinting ability. You have three tries in all. Overstep the bar in your run-up and the attempt is disqualified.

The computer doesn't cheat either. The evidence of a black footprint will clearly prove your failure.

The next sport is the hammer throw. This proved to be the most challenging of all the events. You have to whirl round like a dervish, and release the hammer at the critical moment. Judging the critical moment seems to be either a case of trial and error or split-second timing.

The only way to get near the qualifying distance is by frequent practice. As there is no practice screen for this event, it will prove to be a major pitfall for the first few games.

A running event completes the quartet. The 400m is a gruelling exercise, with up to 14 seconds of frenzied key-bashing. After this event, you'll feel that you had actually run 400m as you collapse in a pool of sweat.

In subsequent rounds of the game, the sights are raised and you have to improve your performance considerably.

This will appeal to players who like the track and field type of game. The running events in particular are rather banal, with very little skill required at all.

Graphics are up to Konami's usual high standard, complete with beautifully animated athletes and simpler but still very effective backgrounds.

In the long term, you are likely to get bored with these events, and will want to seek out the rest of the Konami athletics series. In the meantime, this is likely to keep some people at home instead of rushing to the pub for their next crack at Olympic stardom.

Graphics: *Excellent*
Sound: *Used sparingly but to good effect*
User Appeal: *Mainly Track and Field buffs*
Conclusions: *Faithful representation of an arcade favourite*

TEACH YOURSELF ELECTRICITY

Supplier: Megacycal Software 051-652 3139
Type: Educational
Format: Cassette
Price: £9.20

Before the advent of computers, if you wanted to learn about something you went to evening class or borrowed a book from the library.

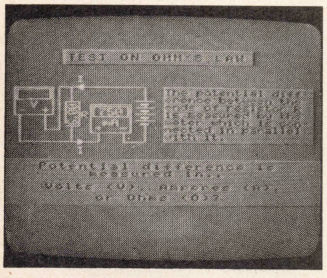
Now you can get an educational program, load it into your MSX computer and learn all you ever wanted to know about . . .

Electricity. That's the subject of this program from Megacycal. It is aimed at teenagers and adults, needs a 64K machine and comes with a 16-page booklet.

By the end of the program, you should be able to work out currents, resistances and voltages, work with Ohm's Law and design a galvanometer. Various questions test your understanding.

Loading takes six minutes, and gives a six option menu. Getting back to the menu is very simple.

Each section of the program is complemented by a section



in the manual. In fact, without the manual, the program is little more than an extended question and answer session.

The first section introduces primary concepts with a mixture of text and diagrams. A certain amount of user interaction is involved, such as opening and closing a switch in a circuit diagram and changing the resistance of a rheostat.

From then on it is questions and calculations based on the lessons in the manual. You'll need a calculator to work out some of the answers, though the computer will supply the right answer if you can't.

After each set of questions, you are given a score. Redoing the questions gives different values for the variables, so you can't learn answers by heart.

Questions are accompanied by simple circuit diagrams and the menu is usually only two keystrokes away — the overall design is very user friendly.

The problem lies in that the program doesn't deliver enough. Most of the tuition comes from the manual — the program is really little more than a dressed-up series of questions. The dressing up is neat and embodies some good ideas, but there is no escaping the fact that you aren't being educated so much as tested.

It boils down to the subject matter. Electricity is not easy to demonstrate and the programmer must decide whether to tackle a few subjects, using the resources of the computer, or cover a broader range with less tricks.

Megacycal has opted for the former approach, and for that reason *Teach Yourself Electricity* looks good on the screen and is well presented.

Text windows, a few animated circuit diagrams and testing questions are the best points. On the debit side, there are occasional word overflows in the first section, and key response can be a little slow at times.

At £9.20, this is an expensive program for what it will teach you. As with a great many educational programs, it must be said that a book on the subject will teach you a great deal more, even if it is not as hi-tech as a microcomputer.

Teach Yourself Electricity is a good effort but it is limited in scope and a trifle costly.

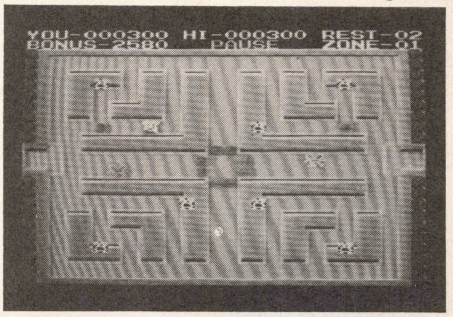
Graphics: *Some clever ideas*
Concept: *Dressed up question and answer session*
User: *Looks good on the screen*
Conclusion: *Consider a book first*

MOPIRANGER

Supplier: Konami 01-429 2446
Type: Arcade
Format: Cartridge
Price: £14.95

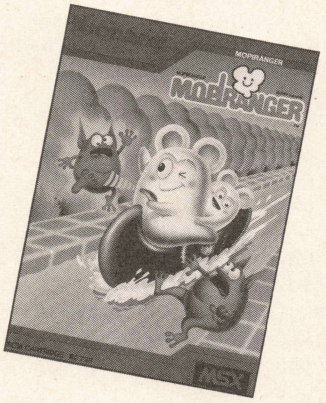
Japanese games often have a certain cuteness about them. In this maze-type arcade game, you have to rescue little Moplits, held by galactic kidnappers called Razons (who makes up these names?) in their underwater castle. You are Mopyland's superhero, Mopy Ranger.

Each screen has a different pattern of obstacles, with the trapped Moplits clearly visible.



They are freed by moving Mopy Ranger next to them. Free them all and you move onto the next level.

The Razons are out to thwart you of course. They start from two bases and move round the screen in pre-determined patterns. Touch one and you lose a life.



Your defence is a weapon called a stone beamer which turns a Razon into stone. These stones, and those already on the screen, can be moved down passages to block them off.

A third factor is a system of tidal flows in the passages that slow down or speed up your movement. With the maze pattern, tidal flows, rocks and Razons, there is plenty to keep you busy.

You start with three lives and gain another for each level cleared. Points are scored for freeing a Moplit, turning a Razon to stone, and completing a screen within a time limit.

You get bonus points for clearing a screen without using the stone beam, and occasionally get bonus levels with no Razons to impede you.

On screen is the current score, highest score, time bonus remaining, level and lives remaining. Pressing F1 pauses the game — very useful for examining new levels or answering the phone. If you press F2 you suicide, and this may be necessary if you block yourself in with stones.

On the higher levels you encounter an unstoppable Big Razon. It dissolves stones, and this can work for or against you. You also have stationary objects that kill Razons when they touch them.

Mopiranger's sound effects are a varied mixture of pips, beeps, a short tune and so on — noise is constant but appropriate. The graphics are well up to Konami's normal standard, colourful and cute.

As arcade games go, this one is more strategic than many. If you like puzzles, it will become addictive, and it is sufficiently different to warrant warm recommendation.

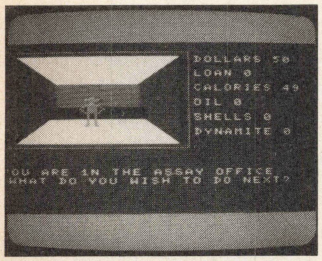
Graphics: *Usual cute characters*
Sound: *Helps you play better*
User Appeal: *You'll need to use strategy*
Conclusion: *A good variation on the maze theme*

DEATH VALLEY GOLD RUSH

Supplier: Kuma Computers (07357) 4335
Type: Adventure
Format: Cassette
Price: £7.95

It's way back in the bad old days of the Wild West and gold prospecting is one of the most popular pastimes. You've inherited the deeds of old Adam's mine and it's your task to dig up the contents.

One of the first locations you can move into is the Saloon. Our first instinct was to look around for clues. When we typed in 'look', a standard adventure term for seeing what the room contains, no clues were forthcoming. In fact we were told, 'Oh . . . my keys



hurt,' and then more aptly, 'You're backin' a loser'. Not a good start.

After some time you will realise that it is impossible to find out what is in a room. You have to guess what is likely to be there and then buy or borrow it. For instance in a saloon, you are likely to get . . . yes, a drink.

Before rushing off into the surrounding mountains on a prospecting expedition, you have to first get the necessary equipment. Unfortunately all the shopkeepers are charging inflated prices for their goods so you'll need more than the $50 given to you at the start.

Common sense and some knowledge of gold prospecting will be advantageous when collecting your equipment because you have to guess what you'll need.

For example, in some locations you encounter a dangerous rattlesnake. How would you deal with a rattlesnake? Call it a nice snake and ask it to go away? No, you would shoot it dead and you can't shoot anything unless you have a suitable firing instrument. So by a logical deduction process you can surmise that some sort of gun is needed.

Two different screens are used in the game. On the screen for moving between locations, certain vital details are displayed; how many dollars, loan, calories, oil, shells and dynamite sticks you are carrying. These items will have to be bought or borrowed from shops.

Colourful graphic displays illustrate the locations and they are quite good considering that the program has been written in BASIC. The other screen is for conducting dialogue — 'buy drink' for example.

Once out of town you pass through locations such as Parsons Creek and Death Canyon before passing into a mine. In here, falling lethally down a mine shaft is a common occurrence, we found to our cost.

Unfortunately neither the Save or inventory facilities were available on our preproduction sample of the game, so dying meant starting from the beginning again. A Kuma spokesman tells us that these facilities will definitely be included in the final production version.

Adventures are invariably much better if they are written in machine code than in BASIC. Response times are faster, there are more locations and puzzles and a greater vocabulary can be incorporated.

As we've said, *Gold Rush* isn't too bad for a BASIC adventure and it can be solved fairly easily. But if you're used to adventures written by the specialist software houses you might be a little disappointed by it.

Graphics: *Bright and cheerful*
Sound: *Some sound — unusual for an adventure*
User Appeal: *Gets easier after a while*
Conclusion: *Fairly good, considering the price*

SIMPLE ADDITION

Supplier: Mentor Educational Services 010-35346 31268
Type: Educational
Format: Cassette
Price: £7.95

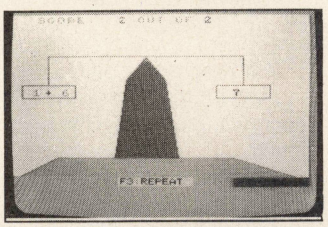
Simple Addition is aptly named as it focuses on extremely simple adding concepts for the three to seven year age range.

Mentor Educational Services, the author of a wide range of educational software, has concentrated its efforts on programs dealing with the basic concepts in mathematics — *Simple Subtraction* and *Trigonometry* for example.

Because they deal with only a few important principles, the programs don't get too complicated and the ideas that are introduced are thoroughly dealt with. *Simple Addition* is no exception.

Crane is the first exercise on the program's menu and shows a crane above a lorry and trailer loaded with blocks.

The idea in this exercise is to move a specified number of blocks from the trailer to the



lorry. Attached to one end of the crane is a rope and hook and by using either a joystick or keyboard, the student is able to transfer them.

As the blocks are moved from the trailer, the number indicating how many blocks there were on the trailer goes down, and, similarly, as the block lands on the lorry the number showing the amount of blocks on the lorry goes up.

Once six blocks, or however many the student was asked to move, have been transferred, a jolly tune or funereal dirge tells you whether the task was completed rightly or wrongly.

In addition to helping a child to count, this exercise illustrates what happens to a number when an amount is subtracted or added to it.

With the next exercise, Blocks, you are first given the opportunity to watch a few automatic sums on the box grid displayed on screen. If, for example the sum is 3 + 4 =, it appears below the grid and seven boxes are filled in with blue and pink colours. The number seven, the sum's answer, is then automatically filled in.

After three demonstrations, the boxes are again filled in, but this time the student has to insert the answer. Depending on the answer's accuracy a huge tick or cross appears. As the student continues to answer the sums, the number he or she has accurately completed is indicated; for example, 'The score is two out of three'.

By counting the coloured squares in the row of boxes, the child reinforces counting skills and also sees what happens to numbers when they are added together.

In the first two exercises, it wasn't absolutely necessary for students to add numbers together, but in Scales, the third exercise, it is essential.

A balance fills the screen and on the left side a sum such as 2 + 5 = ? is shown. To balance the scales, the correct answer has to be inserted on the other side. If the wrong answer is repeatedly given, the correct answer is shown.

Younger children will need help when first attempting this program, but as it is menu driven and extremely simple to use, they won't need help for long.

Both sound and graphics are rather crude and could be improved. The lorry, crane and trailer, in particular, looked rather amateurish.

It's possible that a child's attention won't be held long enough for him or her to assimilate all the adding skills that they could be picking up from this program.

Graphics: *Crude*
Sound: *Not very exciting*
User Appeal: *Easy to use*
Conclusion: *Some interesting ideas*

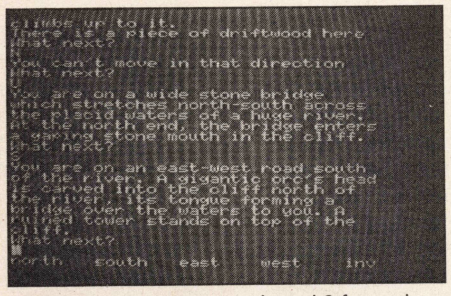
DUNGEON ADVENTURE

Supplier: Level 9 Computing (0494) 26871
Type: Adventure
Format: Cassette
Price: £9.95

At last, your chance to become richer than your wildest dreams. The Demon Lord is as dead as a dodo and while everyone is celebrating in Minas Tirith it's your plan to race off to the demon's hideout and grab all his unguarded treasure.

Of course life and Level 9 adventures aren't as simple as that. You start your quest complete with weapons, horses and magic, but on the way you are waylaid by robbers and thrown in a river. You find yourself lying on a sand bank, cold, wet and weaponless. Now the adventure starts for real.

Once again Level 9 has created a wonderful adventure, sparking off your imagination and transporting you into a world where electricity bills and mortgages have no place. All you have to remember is that without wits, cunning and patience you won't survive.


climbs up to it.
There is a piece of driftwood here
What next?
N
You can't move in that direction
What next?
U
You are on a wide stone bridge
which stretches north-south across
the placid waters of a huge river.
At the north end, the bridge enters
a yawning stone mouth in the cliff.
What next?
S
You are on an east-west road south
of the river. A gigantic orc's head
is carved into the cliff north of
the river. Its tongue forms a
bridge over the waters to you. A
ruined tower stands on top of the
cliff.
What next?
north south east west in

Over 200 locations have been incorporated into *Dungeon Adventure* and as the title suggests, most of the action does take place in the weird and wonderful depths of the Demon Lords' mountain.

Strange, fearsome creatures such as skeletons, globs of carnivorous jelly and grotesque bloated yellow birds with big ears abound, and you will need to retain a strong sense of humour as time and time again you find yourself thwarted by them.

Dungeon Adventure is a text adventure so your imagination will be tested to the full as you stumble across will o'wisps floating around in muddy puddles, slivers of rancid potato and psychedelic mushrooms.

All these things have important purposes and it's up to you to find out what they are — without getting killed in the process.

As there are more than 200 locations, the best way to play the game is to draw a map as you pass through. So if by chance a ghoul jumps out at you or a hand grabs you by the throat and you end up back at the beginning, at least you'll know how to get back. Saving the game as you go along is also advisable.

One of the best things about Level 9 games is that they understand such a wide vocabulary. You are not constantly told, 'I don't understand,' although you do sometimes have to say the same thing in several different ways before getting the required response.

If you do get stuck, you have the opportunity to write to Level 9 for a clue sheet. The only trouble is that once you've got it, you can easily spoil the game's challenge because its very hard to resist (speaking from experience!) the tempation of having a quick look at the clues when you meet a problem.

This game will take weeks, even months to complete. For £9.95 there is no better entertainment than a complicated, puzzling, humourous adventure game and *Dungeon Adventure* definitely fits the bill.

Graphics: *None*
Sound: *None*
User appeal: *Great entertainment value*
Conclusion: *A truly challenging adventure*

KING'S VALLEY

Supplier: Komani 01-429 2446
Type: Arcade
Format: Cartridge
Price: £17.40

Fame, fortune and the secret of eternal life lie beneath the Valley of the Pharoahs just waiting for Vick (that's you) to go and find them.

Of course it's no easy task; not only did the Pharoahs employ the cleverest tomb architects to design the stone burial crypts but dangerous mummies are wondering around the pyramids guarding the mysterious sparkling jewels. Gathering all these precious stones will reveal the secret of eternal life.

Luckily Vick, an English adventurer, stumbles through the doorway of the first pyramid crypt and finds himself in a room filled with yellow brick platforms and stairways.

Once in the first pyramid you have to act quickly because two mummies materialise from what resembles a puff of smoke and start to follow you. They are lethal and although you can jump over them it is best to either avoid them or fling one of the swords in their direction.

You do have five lives, and get an extra one every 2,000 points.

What we liked best about this game is that it combines the thrills and spills of a zap 'em flat arcade game together with the careful planning of an adventure game. It is no good just guiding Vick aimlessly up and down platforms hoping for the best. Once you're past the first pyramid level, strategy is required.

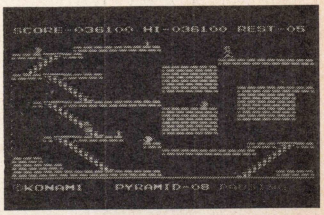
This is where the pause facility comes in useful. By using it you can work out where to go and what to carry for optimum points. Many of the pyramid levels contain two screens which scroll across as you pass through one side.

Besides getting through all the levels, you've got to win points. Knocking down mummies, collecting jewels and clearing stages all increase your score.

Some of the jewels are hidden in brick boxes or in locations which can only be reached by digging through the surrounding wall. The pick axes for this task are scattered around the platforms. Once the pick axe has been used it disappears — so use them carefully.

Occasionally you might find yourself at the bottom of a hole, unable to get back up. So, rather than go all the way back to the beginning of the game, you can press F2 and start at the beginning of that pyramid level.

Four mummy types exist and move around the platforms in slightly different ways. The red ones tend to walk slowly along the platforms and then rush up and down the ladders at breakneck speed. White mummies move in a fairly predictable manner while the blue and yellow mummies leap up and down as they move along.



Konami has incorporated a few infuriating details into the program. For example if you're holding either the sword or pick axe, you can't jump. Similarly, it is impossbile to get through the swing doors if you're holding anything.

Once all the jewels are collected from the pyramid, the exit as well as the entry door appears. If you accidentally go through the entry door, you'll find yourself travelling backwards on the Pyramid Map which shows your overall position between pyramid levels.

Like most Konami games *King's Valley* utilises clever, realistic, colourful graphics.

Graphics: *Bright and colourful*
Sound: *Egyptian ditties*
User Appeal: *Amusing, addictive*
Conclusion: *One of the best platform games we've seen*

DOGFIGHTER

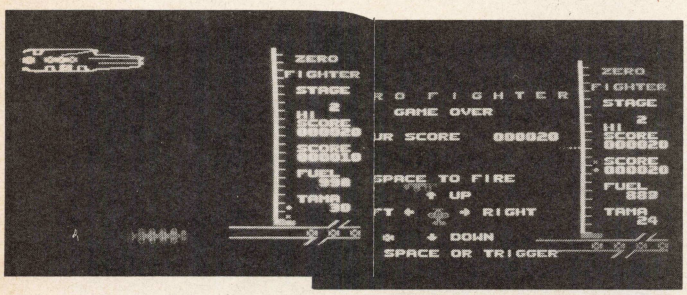
Supplier: Kuma Computers
(07357) 4335
Type: Arcade
Format: Cassette
Price: £6.95

World War 1 pilots were true gentlemen. Pilots would never kick a man when he was down, they would occasionally exchange polite aerial pleasantries and go home for tea and muffins. Of course, some poor blighters bought it, but they probably did something offensive like wear an Oxford tie when they really went to Cambridge.

This romantic image of heroes of old is rudely shattered by Kuma's *Dogfighter*. The cads in this game would never have got past the gates of Eton, let alone behind the controls of a biplane.

The action takes place over the English Channel. As a noble flying ace, you have to put a stop to a squadron of dastardly enemy aircraft that is based on an aircraft carrier.

Your main screen gives you information about your altitude, ammunition and fuel levels. Your altimeter is very important. Dive too low and you may find that you've ditched rather unceremoniously into the drink. The height of enemy aircraft is also displayed on the altimeter.



It is impossible to tell which enemy aircraft is which. You may be surprised to find yourself in a mid-air collision with a plane which has swooped down on top of you.

An enemy fighter appears full size on the screen when its altitude matches yours, and the dogfight can well and truly begin. Your aircraft is faster than the enemy which gives you the necessary edge to cope with four or five fighters at a time.

A direct hit will send a plane blazing into the sea. Despatch one screenful of fighters and — you've guessed it — even more come up to duel with you.

The aircraft carrier may also be destroyed. Shoot a plane down over it and hope that the stricken craft plummets down onto the ship.

The best way to handle a dogfight when you have a number of fighters on the scene is to wait until one of them breaks from the pack. You can then move in, hope for a quick kill and exit as fast as possible leaving time to plan your next move. When you have five fighters at your altitude, it becomes very difficult to concentrate on one target without running the risk of being attacked from all directions.

Often, you will find yourself playing cat and mouse with the enemy. As you climb to start a battle, the fighter will either climb still higher, or dive well below you. They have a self preservation instinct too.

This game offers a fair amount of enjoyment. Mastering the aircraft's controls is a feat in itself, let alone the prospect of locking yourself into aerial combat.

As with any game, once the method has been mastered, destroying aircraft is an absolute doddle (old bean!) and you'll be on the lookout for new thrills.

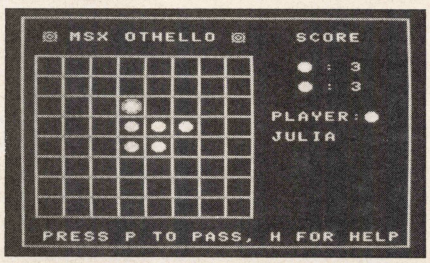
Graphics: *Simple but recognisably biplane*
Sound: *Basically realistic*
User Appeal: *Budding Red Barons*
Conclusion: *An effective game — worth a shot*

OTHELLO

Supplier: Knights Computers
(0222) 630526
Type: Board Game
Format: Cassette
Price: £5.95

Computer versions of board games have a number of advantages: no pieces to lose, no board to set up and a ready playing partner. The computer is (nearly) always a better player than you are, so there is much to learn by watching its playing strategy.

Othello is a game played with counters like draughts, which are white on one side and black on the other. Each player adopts a colour and aims to gain dominance of the 8×8 board by having more counters of his own colour on the board.



To this end, a player must capture an opponent's piece by sandwiching it between two of his own pieces. The counter is then turned over to display the new owner's colour.

A counter must be placed next to another of an opposing colour. All the possible legal moves may be displayed by typing H for help at any time during the proceedings. The moves are indicated with question marks.

Othello from Knights is written in BASIC. Board games do not require great speed, so this is no great disadvantage. Writing such a game in machine code is probably more trouble than it's worth anyway.

After loading the program from tape, you can take a look at the program using LIST. Unlike adventures, this is unlikely to help you beat the computer, but it may help you to understand how strategy board games may be written.

You can opt for a number of playing options. The first of these is computer *vs* computer which will give the newcomer an idea of how the game is played.

There is also a two-player option, but human against computer will probably be the most widely used.

Counters are placed on the board using a joystick or cursor and pressing the trigger button. Any invalid moves are signalled by the computer.

Once you have made your move, the computer will start 'thinking' about its own gameplay for a while, before (usually) inflicting great damage on your plans.

The computer is a red-hot player, and its strategy appears almost infallible. You can come quite close to beating it but not quite — you would need to be an experienced *Othello* player before you stood a ghost of a chance.

Various skill levels are a must for a game of this nature. In this version, you enter the game at expert level straight away, giving the computer a rather unfair advantage.

The mechanics of playing are a little dodgy too. The cursor movement is very uneven, and it often takes a while to put the counter exactly where you want to.

It is a great pity that more time was not spent on the graphics. The game may play well, but it looks tatty. Even the game's title screen looks unprofessional, which is hardly a good advertisement for the rest of it.

As it is, it looks like a rush job. Its price is probably equivalent to that of the board game itself, so unless you are really stuck for a playing partner you could fare better.

Graphics: *Poor*
Sound: *Bare essentials only*
User Appeal: *Keen single Othello players*
Conclusion: *Scruffy to look at but plays well*

SIMPLE SUBTRACTION I

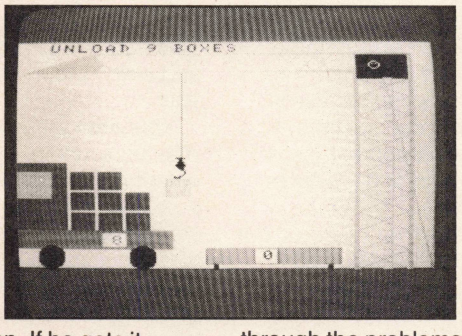
Supplier: Mentor Educational Services
0101-35346 31268
Type: Educational
Format: Cassette
Price: £6.95

It's probably true to say that children find subtraction harder to grasp than addition, so many parents could be relieved to find that Mentor's *Simple Subtraction* is designed to overcome any difficulties here.

The program is aimed at children between the ages of three and seven years who may be tackling arithmetic for the first time or need to brush up on what they have forgotten.

The program gradually introduces the concept of taking away using objects like cranes, scales and building blocks.

By moving the cursor control keys to control a crane the user takes away a specified number of boxes and places them on a lorry. If the right number of boxes are removed a 'correct' message flashes up on the screen and the child then goes on to the next section. If he gets it wrong the computer takes over and the crane lifts off the required number of boxes.



The correct answer is then displayed using colourful blocks showing that, for example, 7−4=3.

Later on in the program this concept of taking away is reinforced by the use of a pair of scales. Brightly coloured and dominating the whole screen, the scales hold an unequal number of blocks in each scale pan. The idea is to move the blocks from one side of the scale to another until they are equally balanced.

If the scales end up unbalanced, the computer takes over and the blocks are moved around until they are corrected.

Mentor seems to have acquired a knack in making educational programs fun to use. By using large diagrams and bright colours, (the sort that hold most children's attention), *Simple Subtraction* is also attractively presented and more light hearted than traditional text books.

This is one of 10 titles for the three to seven age range, designated level 1. Seven to ten year olds are catered for in level II,and level III covers trigonometry aimed at pre-secondary school children.

Mentor is also working on a fourth level which will cover topics up to 'O' level and CSE.

The company eventually plans to offer a total of 40 titles that can be used both in the school and at home.

As there are very few educational programs on the market we couldn't really compare *Simple Subtraction* with a similar program. However, having worked through the problems we found the topic easy to grasp with each step carefully illustrated.

At £6.95 the program is reasonably priced and its educational content is high — definitely a title to be considered.

User appeal: *Easy to use and fun*
Content: *Attractively presented*
Graphics: *Well designed*
Conclusion: *Should be seriously considered by parents*

MEAN STREETS

Supplier: Kuma (07357) 4335
Type: Adventure
Format: Cassette
Price £6.95

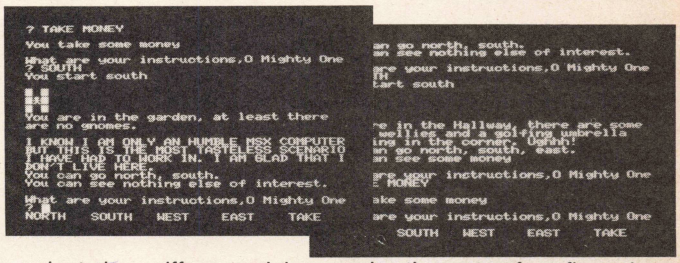
As far as adventures go this one from Kuma is totally different; bizzare isn't the only word that springs to mind to describe it!

Kuma reckons that *Mean Streets* is an adventure with a difference and they sure ain't kidding!

The adventure is all about living in the eighties, and the task set before the unsuspecting player is to get to work.

Sounds easy, and it is if you're as logical as Mr Spock and plan every move methodically.

The blurb on the cassette cover warns you that you're up against glue sniffers, social workers, politicians and a receptionist who ignores you. And it goes on to inform you that *Mean Streets* is a game with political awareness and street credibility . . . playing is believing!


? TAKE MONEY
You take some money
What are your instructions,O Mighty One
? SOUTH
You start south
You are in the garden, at least there are no gnomes.
I KNOW I AM ONLY AN HUMBLE MSX COMPUTER BUT THIS IS THE MOST TASTELESS SCENARIO I HAVE HAD TO WORK IN. I AM GLAD THAT I DON'T LIVE HERE.
You can go north, south.
You can see nothing else of interest.
What are your instructions,O Mighty One
? NORTH SOUTH WEST EAST TAKE
an go north, south.
an see nothing else of interest.
are your instructions,O Mighty One
IN
tart south
re in the Hallway, there are some
welling and a golfing umbrella
ing in the corner. Ughhh!
an go north, south, east.
an see some money
are your instructions,O Mighty One
? MONEY
ake some money
are your instructions,O Mighty One
SOUTH WEST EAST TAKE

The blurb on the cassette cover warns you that you're up against glue sniffers, social workers, politicians and a receptionist who ignores you. And it goes on to inform you that *Mean Streets* is a game with political awareness and street credibility . . . playing is believing!

The opening scene has you in bed in your bedroom. The walls are covered in Laura Ashley paper and are hung with some pretty tacky prints, all good information full of clues.

Getting out of bed and into the bathroom, washing, dressing and eating are your next objectives. Whatever you do don't treat this like other adventures. There are no red herrings and the best advice we can give is to grab everything you clap eyes on.

Although you won't be able to carry all the items, you can create dropping stations so that you can go back and pick up objects as and when you need them.

We found that everything except the toothpaste tube was essential, but we're sure that has a purpose other than for cleaning teeth.

Often we found ourselves going round in circles which weren't immediately obvious. As Kuma doesn't provide any clue sheets, drawing a map as you go further into the adventure is an absolute must.

Getting to the office was finally cracked after a few long sessions of play. Anyone with an ounce of common sense should be able to find their way through in the end, just by taking everything at face value and applying logical and practical thinking.

For instance, quite a way into the game you meet up with some boiler workers who are sweating profusely and you are asked if you can help.

The obvious thing to do is to give them your face flannel.

Kuma has also injected some of its own humour into the program (or rather the programmer who wrote *Mean Streets* has) by inserting the odd paragraph like: 'I know I'm only a humble MSX computer but this is the most tasteless scenario I've had to work in, I'm glad that I don't live here!'

Some might say that just about sums up the whole game, particularly as there are only nine commands, four of which are north, south, east and west.

If you're a true adventure freak then this isn't going to do much for you. But if you've never played an adventure in your life, then this is a good introduction. *Mean Streets* is light hearted, tacky in places but good fun.

Graphics: *There aren't any!*
Commands: *Very limiting*
Setting: *Novel idea for an adventure*
Conclusion: *Fun to play*

FLIGHT PATH 737

Supplier: Anirog (0322) 92513
Type: Simulation
Format: Cassette
Price: £6.95

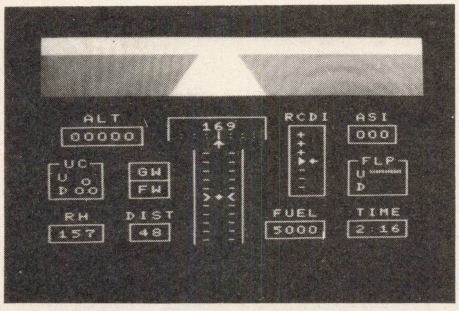
Being near Heathrow, we are only too aware of aeroplanes, thundering overhead time and time again! *Flight Path 737* was our chance to pretend we were in the pilot's seat, and a nerve-wracking experience it is too.

Anirog's program puts you in command of a Boeing 737. Your task is to take off, fly over a range of mountains and land safely. It sounds simple enough, but is in fact quite a task.

Loading from cassette takes a few minutes and gives you time to peruse the multilingual manual. There are only five pages of instructions, so learning the controls doesn't take long.

Learning to read the screen will take practice, as there are quite a few significant displays to absorb.

At the start you select a level, ranging from first solo flight to test pilot. The aim of each flight is to clear



mountains and land on the other side. Higher levels mean higher mountains, shorter landing strips, possible emergency fires to deal with, crosswinds and more stringent marking.

The flight procedure is nonetheless similar. The aircraft must be taxied, flaps lowered, speed increased and takeoff executed. Then it is a frantic juggling of controls to maintain airspeed, keep climbing, raise the flaps and undercarriage and stay in control.

There may only be a few controls but you'll need to act quickly to avoid disaster. The program gives no quarter.

After taking off, climb until the mountains are below you. You'll then get a new runway heading and will have to descend, lower flaps and wheels, land and stop within the length of the runway.

Four function keys control speed. Pairs of keys work the flaps and undercarriage, and cursor control keys control climb and turning. The screen shows the view from your cabin (runway, mountains and sky) plus your airspeed, heading, rate of climb, flap and undercarriage status, distance to runway, fuel level, time elapsed and also gives sundry warnings.

Sound is minimal, limited to an introductory ditty and the sound of engines.

There is a real challenge to *Flight Path 737* and it will take time to master. It is far from dull, as action happens quite rapidly. A game pause facility would help, as would a joystick option. Still, if you have a yen to fly, do try this program.

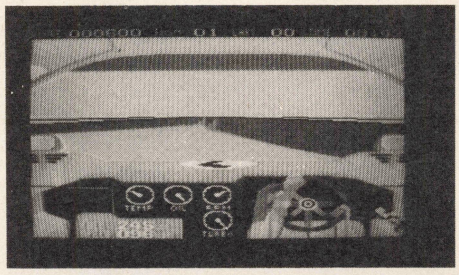
Graphics: *Plenty to keep you occupied*
Sound: *Minimal*
User appeal: *For budding Biggles everywhere*
Conclusion: *Good value and a challenge too*

LE MANS

Supplier: Electric Software (0954) 81991
Type: Arcade
Format: Cassette
Price: £9.95

No motor race has quite the glamour of Le Mans — 24 hours of hard, fast driving in high performance cars. Thanks to Electric Software, you can take the wheel of a racing Class C Porsche and try your skills on the track.

You'll need a 64K MSX to play. The program loads in five minutes and after the company logo, a title screen depicting your car and a fanfare, the game goes into demonstration mode.



This is about the only time you'll have to examine the graphics in detail, as while you are racing there's just too much going on for you to take your eyes off the track.

Electric has tried to be as realistic as possible. The car has true to life power and performance characteristics, and the track you race on is copied from the Le Mans track. The only difference is that you race for 24 minutes, not 24 hours.

A race lasts until you run out of fuel (you start with 250 litres), run out of time or complete 10 laps. Your aim should be to complete the 10 laps in as fast a time as possible. You score points for overtaking and lapping competitors, completing laps and finishing with time or fuel to spare.

Unlike many other racing simulators, you have rivals on the track — 19 of them. You start in sixth place. The lights turn green and the rest of the field roars past. Now it is up to you.

Controls are straightforward. Using the cursor keys or a joystick you accelerate, decelerate, go right or left. The space bar/fire button gives braking accompanied by a squeal of tyres.

On the screen you see the track snaking towards you, other cars and a grandstand at the start of each lap. There are also the car's controls.

Gauges indicate engine temperature, oil pressure, RPM and turbo activity. Fuel left, current speed, points, position, lap and time elapsed are shown as figures.

The really striking feature of *Le Mans* is that the graphics are designed so you feel that you are in the car yourself. The view of the track is what you see through the windscreen.

As you turn, your hands turn the wheel, and as you accelerate, your right hand reaches out to change gear. The programming here is quite remarkable.

In addition to all that, there is a pair of rear view mirrors, so you can actually see the cars coming up behind you — and all too often overtaking you!

Your ears are bombarded with the sound of a powerful engine, or a resounding crash if you make a mistake. Going off the track is not necessarily disastrous as you can recover if you're lucky, but you lose speed and time. Crashing loses you fuel, speed and time.

As racing programs go, this one is excellent. Superb graphics, lots of action, and controls which test your skills to the limit make a most desirable program that's well worth the asking price.

Graphics: *Who needs video disc interfaces!*
Sound: *Ear muffs essential*
User appeal: *More fun than the M4 in rush hour*
Conclusion: *Lay in food supplies for a week*

SHADOW OF THE BEAR

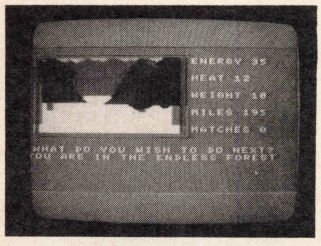
Supplier: Kuma Computers (07357) 4335
Type: Adventure
Format: Cassette
Price: £7.95

You, an entrepid spy plane pilot, have crash landed onto the snowy wastes of Siberia and find yourself totally alone — except for wild beasts inhabiting the nearby forests.

Your aim is to fight off rabid wolves, bears and the entire Russian army to escape from Siberia into the relative safety of China.

Although the plane is a total wreck, you are advised to collect a few items from it — a gun, wire and matches. These will help you to survive the arduous trek to freedom. Of course you are are going to need a few other things before you finally cross the Soviet/ Chinese border.

Shadow of the Bear has been written in BASIC so the responses are very slow. Once you've got used to the time lags and the occasional program crash (we pressed the letter W and the Return key together in the Snowfield location and found ourselves



back at the MSX introductory screen!) it is quite addictive.

Two different screen modes are used in the game for instruction input. Commands guiding yourself between locations are typed into the first screen and it is livened up with colourful graphics. Once you reach a location and decide to do something such as GET axe or SEARCH hut, you have to pass into the other mode.

Certain restrictions govern your movements through the Siberian wilderness. At the start of the game a certain number of energy, heat and weight points are given to you.

But moving in any direction loses both energy and heat points and these nave to be replenished.

Also listed together with these restrictions are the number of matches still in your possession and the number of miles you have travelled so far.

Frequent snow storms whip up very suddenly, completely obliterating all your surroundings. You have to blindly move around searching for shelter — usually a hut.

Once inside, the storms disappear, but valuable energy points have been lost in the meantime. No warning of their onslaught is given and like many aspects of this game their appearance is completely at random.

Clues in the instructions and in the game itself make many of the simple puzzles extremely easy to solve. For instance, to regain heat points, it's fairly obvious that you will either need warm clothing or a fire.

Huts serve two purposes; they provide shelter and house useful objects. What is infuriating is that they are never where you think they are.

For example you might pass into the Minski Woods and find a hut complete with lamp, but next time you move into that part of the woods, the huts are no longer there!

This aspect of the game may annoy those adventurers used to games where items remain where they were found.

Our advice is that if you're not used to adventures, but would like to play a simple one, try this. Some of the bigger, more complicated adventures can sometimes be a little difficult.

Shadow of the Bear has a limited vocabulary, very obvious puzzles, a small number of locations and would suit the beginner.

***Graphics**: Slow but fun and colourful*
***Sound**: Very simple*
***User Appeal**: Beginners only*
***Conclusion**: Easy but playable*

SKY JAGUAR

Supplier: Konami 01-429 2446
Type: Arcade
Format: Cassette
Price: £17.40

When *Space Invaders* made its appearance on the video game scene it sparked off considerable interest. Normally sane people became *Space Invaders* addicts overnight, and *Sky Jaguar* could well inspire similar feelings.

Sky Jaguar is your fighter aircraft and according to the manual you are despatched by the United Earth's Self Defence Forces to fight off a mysterious invading fleet from the Zeifart nebula.

The enemy has already established gigantic floating battle fortresses on Earth's oceans, and it's your task to destroy these as well as the aliens.

As with *Space Invaders*, the enemy drop from the top of the screen and you have to shoot missiles up towards them. Scrolling downwards, underneath all the action, are various earth scenes and these give the effect that you are flying long distances over varying terrain.

Sky Jaguar starts the game just before what looks like a vast blue silicon chip and soon the Drinkas, the first wave of enemies, appear. There are nine different types of enemy forces altogether and each one has a unique set of fighting tactics.

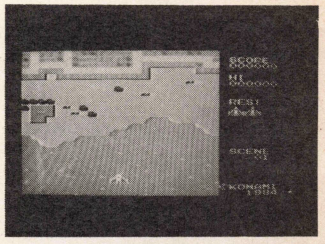
As the game progresses more and more enemies attack: ball-shaped black Balas; rotating Hammers; missile-shaped Twinbals; Hilakis which can only be destroyed when open; triangular Tranias; Cylods which fire bombs diagonally across the screen; Exbalias which fling bombs to and fro and the two-sided flapping Remaz.

Adding to your difficulties are the indestructible white bombs that all the enemy ships keep firing at you.

Gaining as many points as possible is the aim of the game and besides getting points for destroying the enemy, control towers, fortresses and enemy formations, bonus points can be gained for rescuing parachuting penguins (friendly aliens captured by the alien aggressors).

Hitting one of the enemy crafts occasionally releases one of the power units — small POWs. Flying over these endows you with a double firing capability. Try and get your hands on a joystick with an auto-fire function as otherwise your fingers will get very cramped with continually pressing the fire button.

Once you've negotiated the blue chip, *Sky Jaguar* passes



over a long red rift valley. Once past this scene, you're through to the sea and the fortress. To get past this fortress, four red control towers have to be destroyed.

After travelling over the same three screen scenarios a few times, a bright green forest landscape comes into view. Each time you've destroyed a fortress, you return to the beginning and the enemy attacks get worse. They increase in frequency, change their flying tactics and even start to fire backwards.

Graphics are excellent. Each type of alien is unique and the *Sky Jaguar* responds quickly to your controls. Sounds in the game are varied and very appropriate (the sound of your ship exploding is very realistic) and they add that extra dimension of tension to the game.

Sky Jaguar is brilliant, addictive and compulsive playing, and you can't say fairer than that.

***Graphics:** Colourful, fast*
***Sound:** Nice effects*
***User Appeal:** Anyone could play it*
***Conclusion:** One of the best*

INTRODUCING CIRCLE I

Supplier: Mentor Educational Services 010-35346 31268
Type: Educational
Format: Cassette
Price: £6.95

Circle I is the first of a series of 10 educational packages aimed at 10 to 14 year olds.

In simple terms the program defines the circle and covers the radius, diameter, chord, circumference and the arc.

Once the user has got to grips with all the components the program goes on to introduce the concept of pi.

Later on the formula for the calculation of a circle's circumference is developed and clear, colourful examples are given.

Throughout the program worked examples are provided and it's best to master each section first before moving on to the next.

None of the examples are particularly difficult and most 11 year olds should be able to work their way through them without any problem.

It is important to remember that the diameter of a circle is always equal to twice the radius and that the ratio between the circumference of a circle and its diameter is a constant, ie pi. Once you have grasped these two vital facts life is made a whole lot easier.

Once you've confidently worked your way through all the sections you can go on to test your knowledge by working your way through the four problems set at the end. But be warned — they're not easy and it helps to have a large piece of scrap paper and a pencil handy.

Working through the problems made me realise just how much basic maths I'd forgotten over the years — 50 per cent was all I managed.

If you get any of the problems wrong — and let's face it, unless you're an absolute genius you're bound to get a couple wrong — the computer waves its magic pencil and writes out the answer for you, showing how it should have been calculated.

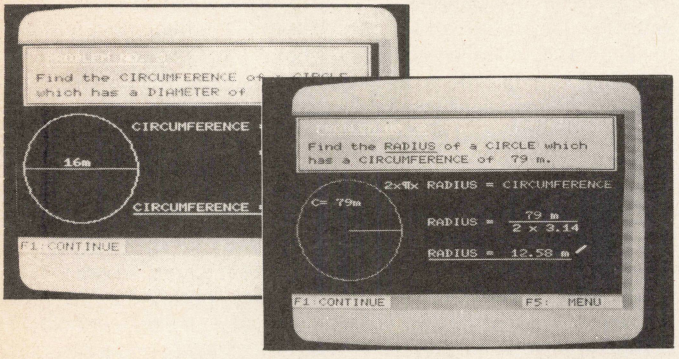
Apart from teaching you the basics the program also teaches you to be methodical. For instance if you're trying to work out a problem, say the circumference of a circle with a radius of 55cm, you need a logical approach.

For a start you need to write down the circumference = 2 × pi × r, then at a glance you can see that 2 × pi × r = 6.28 and 6.28 × the radius (55cm) = 345.40cm.

If you approach all the problems by writing down the formula first it not only looks clearer but is much easier to understand.

For £6.95 *Circle I* offers good value for money. It's ideal for swotting up for your eleven plus or end of year exams and is a lot more fun than burying your nose in antiquated text books.

As for graphics, the use of bright colours and different background shades all add to the program's appeal.


Find the CIRCUMFERENCE of a CIRCLE which has a DIAMETER of
CIRCUMFERENCE
16m
CIRCUMFERENCE
F1 CONTINUE
Find the RADIUS of a CIRCLE which has a CIRCUMFERENCE of 79 m.
2x¶x RADIUS = CIRCUMFERENCE
C= 79m
RADIUS = 79 m / 2 x 3.14
RADIUS = 12.58 m
F1 CONTINUE
F5: MENU

Graphics: *Bright and interesting*
Content: *Comprehensive*
User appeal: *Ideal if you're having problems*
Conclusion: *Well worth buying*

SPREADSHEET

Supplier: Kuma Computers (07357) 4335
Type: Spreadsheet
Format: Cassette/disk
Price: £29.95/£39.95

Spreadsheets are designed to take the hassle out of financial calculations. Data and formulae can be entered in a grid, then manipulated to give budget forecasts, financial analysis and so on.

Kuma's *Spreadsheet* is a medium-priced program which, although unable to do the job of professional spreadsheet packages costing hundreds of pounds, is still nevertheless useful and good value for money.

Loading from tape takes three minutes. You'll need a 64K micro to run the program, as it is written in machine code and needs 48K of RAM. The opening display shows a four column by 16 row area, a status block and two lines of commands, white on a blue screen.

A 15-page manual explains how the program works. There are just 36 commands to get to grips with, and most of them are shown on the screen at one time or another. If you are new to this type of program, you'll soon get the hang of it.

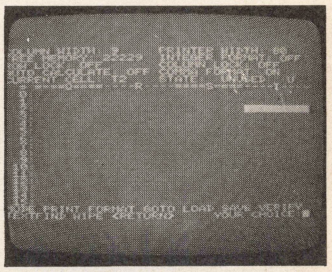
As spreadsheets go, the commands are comprehensive enough to allow fairly complex calculations. You move the cursor either with the cursor keys or by specifying a reference on the 256 × 256 grid. The status block shows if a cell is protected, the type of content, its format and so on — a useful guide that can be turned off if unwanted.

Data, text or formulae is entered in each cell. You can insert a dividing line too. Either the top row or the leftmost column can be frozen, to give a constant display of column/row headings.

Format commands give integer or two place decimal display, with or without commas, to the left, right or centred in a column. Exponential display is another possibility, and essential if you want to use more than two decimal places. A function key toggles between integer and decimal display for a cell.

Formatting is either global or local. You can't format a column or row other than by formatting each cell in it. You'll have to widen columns if you want to make long text entries.

Calculations are done quickly when a formula is entered, or when the return key is pressed, if an autocalc option is selected. Calculations are carried out column by column, so you may need to recalculate several times to get a correct display throughout.



Useful features include the facility to print out a list of formulae, a verify facility so you can check a recording, a text search facility to find a heading and an audible warning when you reach the limits of the computer's memory.

The program does, however, have some shortcomings. For instance, when printing out you only get the cells displayed on screen, so a large spreadsheet will need several printouts pasted together. A replicate facility, to duplicate similar formulae or data is totally absent, and you can't perform comparative operations between cells.

Still, considering the modest cost, Kuma has come up with an attractive package for someone wanting to try a spreadsheet. Unless you want very advanced features, this package will do a thoroughly competent job.

Features: *More than you might expect*
Getting started: *On screen menus are a great help*
Documentation: *Clear and concise*
Conclusion: *Fine unless you need professional features*

BATTLE CROSS

Supplier: Sony (81) 61688
Type: Arcade
Format: Cartridge
Price: £17.95

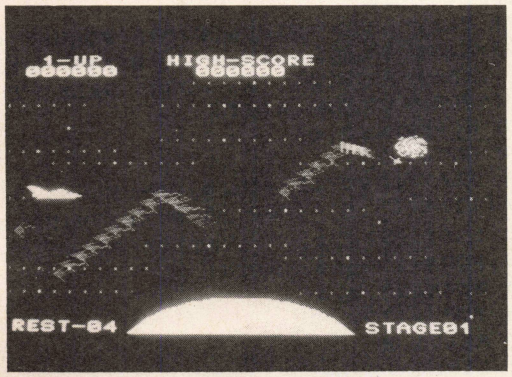
Space shootout fans — pay attention! This is one more game you might consider adding to your software library.

Battle Cross comes from Japan and is on cartridge format. Though a little old fashioned, it's good fun and a reasonable challenge.

Loading is instantaneous and gives you a little screen with a menu of games options — one or two players, with or without joysticks. Do nothing and the game goes into a demonstration mode.

The aim of the game is to blast aliens and survive asteroid storms. There are five stages to negotiate and you have five lives to play with.

Action takes place against a starry background above a planet somewhere in space. Tadpole-like aliens issue from a star cluster and grow in size as they bob up and down the screen. You can move up, down, forwards and



backwards, firing as you go. Contact with an alien is fatal; destroying one nets you 100 points.

Death beams are being fired from the planet at the same time, so going too low could be a deadly mistake. It takes practice to get the hang of avoiding/shooting the aliens as they move in rather unpredictable directions.

After a time with the aliens, a stream of meteors enters the action. You have to avoid these as well as get the aliens. At the end of this ordeal, there is a short tune and the asteroids clear away in preparation for stage two.

Now there are faster aliens to shoot, and lightning bolts zapping across the screen at irregular intervals. Midway through this stage, another asteroid shower arrives.

Stage three is different in that you have to make contact with an object called a magneto cluster. And then in the succeeding two stages, you have to negotiate a cavern with aliens and asteroids. *Very difficult!*

Get used to the movements of the aliens and the game becomes a variation on the *Scramble* theme. The idea is hardly new but Sony has managed to make *Battle Cross* sufficiently different to give it appeal.

The screen shows the usual score, high score, lives left and stage data. There is no game pause facility, nor an abort function.

Graphics are only fair, given the price of the program. Action is not that fast either. For 1985, graphics need to be smoother and faster. Sound is minimal too, with an anonymous tune and zaps as you fire.

The whole effect is a little old fashioned. *Battle Cross* therefore rates as a rather dated arcade game that will keep shoot-em-up fans happy but doesn't really offer most of us enough for an £18 cartridge.

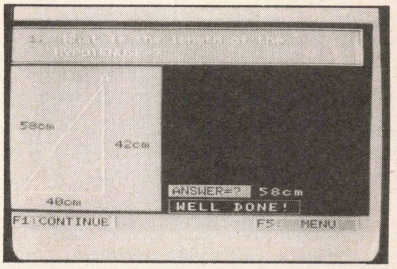
Graphics: *Could be slicker*
Sound: *Simple and repetitive*
User appeal: *Might suit aging Space Invader fans*
Conclusion: *Pricey and dated*

TRIGONOMETRY

Supplier: Mentor Educational Services
010-35346 31268
Type: Educational
Format: Cassette
Price: £7.95

In the not too distant past, eager mathematics students consulted books and teachers for their trigonometry tuition — but no longer. Mentor's trigonometry program will teach 11 to 14 year olds the basic concepts of this subject.

Trigonometry, to use the dictionary definition, is a branch of mathematics



dealing with the relation of the sides and angles of a triangle. It's not a subject of universal interest, but if you're having difficulty understanding how the cosine or tangent of an angle is calculated or are completely in the dark about hypotenuses and adjacent sides of a triangle, look no further.

Before leaping into the more complicated concepts of trigonometry, the obvious first move is to find out what a right-angled triangle is.

On screen you are told that a right-angled triangle has to contain an angle of 90 degrees. Reinforcing this definition are a number of triangular shapes bearing pink squares in the right angles.

Once you've established what sort of triangle you're studying, it's safe to go on.

The program is menu based and if you're a trigonometry novice, you'll have to work your way through the definitions, starting with the number one and working down. Before working out what the cosines, sines and tangents of an angle are, you need to know what the triangles' sides are called, as they are involved in the angle formulae.

For instance the sine of an angle is worked out by dividing the angle's opposite side by the hypotenuse. Both the opposite and hypotenuse are sides of the triangle.

All the descriptions and definitions are demonstrated using flashing lines and colours. The opposite side of the triangle is coloured the same colour as the word in the formula and while the hypotenuse is being described it flashes on the demonstration triangle. In addition to visual reinforcement, simple sounds accompany the program.

The program is impressive, not only because it makes everything sound so simple, but because it is so easy to move within the program by using the function keys.

Five problems are included to test the user, but they are posed in a deceptively simple way. For instance, 'What is the length of a hypotenuse?'. Surely questions in a maths test would be posed in a more cryptic style forcing the student to think what the question actually was before attempting to apply the necessary formula.

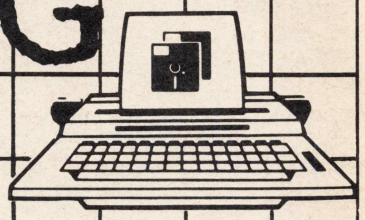
Occasionally it seems that the average 11 to 14 year old would need more information than is actually provided.

The program succeeds in doing what it sets out to do and that is to teach the user the basic concepts of trigonometry — no less and no more. You certainly won't emerge from your computing session a trigonometry genius. But for £7.95, you can't really expect to.

Graphics: *Nothing special*
Sound: *Even less special*
User Appeal: *Extremely user friendly*
Conclusion: *I never knew trigonometry could be fun*

GET TYPING

Feel like doing it yourself? Get your teeth into our readers' programs



PENGY
by Rex Maudsley

MSX seems to have more than its fair share of cute penguins. Rex spent two months pounding the keyboard of his Spectravideo to produce this version of an arcade favourite. You move the penguin around a maze of ice blocks using a joystick or the cursor keys (selected at the beginning of the game). Moving up against an ice block and pressing the FIRE button or SPACE bar propels the block forwards, providing there's no block on the other side.

If all this sounds a little too leisurely, then perhaps you ought to know that the penguin isn't alone in the maze. The poor thing is being chased by three nasty snow bees, each of which has a fatal sting. The only way to kill them is by sliding the ice blocks towards them. If you succeed in killing all three, you move on to a higher level. If, on the other hand, one of them stings you, Pengy goes into a spin — a kind of penguin-like impression of a dying swan.

This is one of the longest listings we've ever printed, taking up around 10K of machine memory. To help you understand it, here's a list of the main variables:

HI	**High score**
0(1-4)	**X axis for snow bees**
P(1-4)	**Y axis for snow bees**
F(1-3)	**Snow bee printing flags**
SC	**Score**
LI	**Lives**
LE	**Level**
TM	**Interval time**
N	**Loop parameter**
Q	**Stick (0/1)**
A	**Block X axis**
B	**Block Y axis**
DI	**Sprite number**
X%	**Pengy X axis**
Y%	**Pengy Y axis**
S	**Stick (Q) value**
M	**Loop parameter**

```
10 REM ************************
20 REM *      P E N G Y       *
30 REM *        B Y           *
40 REM *    ReaLM Soft 85     *
50 REM ************************
60 COLOR11,1,1:SCREEN2,3,0:KEYOFF:OPE
N"GRP:"FOROUTPUTAS#1:GOSUB9000
70 HI=500:DIMO(4),P(4),F(3)
80 SC=0:LI=3:LE=1:TM=32:SCREEN2,2,0
90 RESTORE:GOSUB9000:STRIG(0)ON:ONSTR
IGGOSUB300:ONSTOPGOSUB8600:STOPON
100 PRESET(89,50):PRINT#1,"P E N G Y"
:PRESET(60,130):PRINT#1,"SPACE = KEYB
OARD":PRESET(60,142):PRINT#1,"FIRE  =
 JOYSTICK"
110 FORN=66TO165STEP.5
120 PUTSPRITE0,(N,65),6,0
125 IFSTRIG(1)=-1THEN350
130 NEXTN
140 FORN=65TO25STEP-.5
150 PUTSPRITE0,(165,N),6,2
155 IFSTRIG(1)=-1THEN350
160 NEXTN
170 FORN=165TO66STEP-.5
180 PUTSPRITE0,(N,25),6,1
185 IFSTRIG(1)=-1THEN350
190 NEXTN
200 FORN=25TO65STEP.5
210 PUTSPRITE0,(66,N),6,3
215 IFSTRIG(1)=-1THEN350
220 NEXTN
230 GOTO110
300 PLAY"L32C":STRIG(0)OFF:FORN=130TO
148:LINE(48,N)-(200,N),0:NEXTN:PRESET
(54,136):PRINT#1,"KEYBOARD SELECTED":
Q=0:FORN=1TO500:NEXTN
310 SCREEN2,2,0
320 GOTO400
350 PLAY"L32C":STRIG(0)OFF:FORN=130TO
148:LINE(48,N)-(200,N),0:NEXTN:PRESET
(54,136):PRINT#1,"JOYSTICK SELECTED":
Q=1:FORN=1TO500:NEXTN
360 SCREEN2,2,0
400 FORN=1TO75
410 READA,B
420 LINE(A+3,B+1)-(A+13,B+1),7
430 LINE(A+3,B+15)-(A+13,B+15),7
440 LINE(A+2,B+2)-(A+14,B+2),7
450 LINE(A+2,B+14)-(A+14,B+14),7
460 LINE(A+1,B+3)-(A+15,B+13),7,BF
470 LINE(A+4,B+3)-(A+6,B+3),1
480 LINE(A+10,B+3)-(A+12,B+3),1
490 LINE(A+4,B+13)-(A+6,B+13),1
500 LINE(A+3,B+4)-(A+3,B+6),1
510 LINE(A+13,B+4)-(A+13,B+6),1
520 LINE(A+3,B+10)-(A+3,B+12),1
530 LINE(A+10,B+13)-(A+12,B+13),1
540 LINE(A+13,B+10)-(A+13,B+12),1
550 NEXTN
560 RESTORE:GOSUB9000
570 PRESET(16,184):PRINT#1,"SCORE:
   LIVES:    HIGH:"
580 PRESET(152,184):PRINT#1,LI
```

```
590 PRESET(216,184):PRINT#1,HI
600 PRESET(64,184):PRINT#1,SC
610 IFQ=0THENSTRIG(0)ON
620 IFQ=1THENSTRIG(0)OFF
630 DI=3
640 X%=144:Y%=64:O(1)=48:P(1)=0:O(2)=
16:P(2)=160:O(3)=224:P(3)=160:O(4)=-1
:P(4)=-1:F(1)=0:F(2)=0:F(3)=0
660 ONSTRIGGOSUB2000
670 ONINTERVAL=TMGOSUB1000:INTERVALON
700 IFX%<0THENX%=0
701 IFX%>240THENX%=240
702 IFY%<0THENY%=0
703 IFY%>160THENY%=160
705 IFF(1)=1ANDF(2)=1ANDF(3)=1THEN830
0
710 IFSTRIG(1)=-1ANDQ=1THENGOSUB2000
715 PUTSPRITE1,(X%,Y%),6,DI
720 IFF(1)=0THENPUTSPRITE2,(O(1),P(1)
),3,8
725 IFF(2)=0THENPUTSPRITE3,(O(2),P(2)
),3,8
730 IFF(3)=0THENPUTSPRITE4,(O(3),P(3)
),3,8
740 S=STICK(Q)
750 IFS=0THENGOTO700
760 IFS=1THENDI=2:GOTO800
770 IFS=3THENDI=0:GOTO850
780 IFS=5THENDI=3:GOTO900
790 IFS=7THENDI=1:GOTO950
795 GOTO700
800 IFPOINT(X%+6,Y%-3)=7ORPOINT(X%+10
,Y%-3)=7ORPOINT(X%+8,Y%-3)=7THEN700
810 Y%=Y%-8
820 GOTO700
850 IFPOINT(X%+20,Y%+6)=7ORPOINT(X%+2
0,Y%+10)=7THEN700
860 X%=X%+8
870 GOTO700
900 IFPOINT(X%+6,Y%+20)=7ORPOINT(X%+1
0,Y%+20)=7ORPOINT(X%+8,Y%+19)=7THEN70
0
910 Y%=Y%+8
920 GOTO700
950 IFPOINT(X%-6,Y%+6)=7ORPOINT(X%-6,
Y%+10)=7THEN700
960 X%=X%-8
970 GOTO700
1000 M=1
1010 IFF(M)=1THENM=M+1
1020 IFX%<O(M)ANDPOINT(O(M)-8,P(M)+4)
=1ANDPOINT(O(M)-8,P(M)+12)=1THENO(M)=
O(M)-8
1030 IFX%>O(M)ANDPOINT(O(M)+22,P(M)+6
)=1ANDPOINT(O(M)+22,P(M)+10)=1THENO(M
)=O(M)+8
1040 IFY%>P(M)ANDPOINT(O(M)+6,P(M)+20
)=1ANDPOINT(O(M)+10,P(M)+20)=1THENP(M
)=P(M)+8
1050 IFY%<P(M)ANDPOINT(O(M)+6,P(M)-6)
=1ANDPOINT(O(M)+10,P(M)-6)=1THENP(M)=
P(M)-8
1060 IFO(M)=X%ANDP(M)=Y%ANDF(M)=0THEN
8000
1070 IFSTRIG(1)=-1ANDQ=1THENGOSUB2000
1080 IFM=3THENRETURNELSEM=M+1:GOTO102
0
2000 STRIG(0)OFF:INTERVALOFF
2010 IFDI=2THEN2050
2020 IFDI=0THEN2300
2030 IFDI=3THEN2600
2040 IFDI=1THEN2900
2050 IFPOINT(X%+8,Y%-7)=7ANDPOINT(X%+
8,Y%-23)=7THEN2170
2060 IFPOINT(X%+8,Y%-7)=7ANDX%/16=INT
(X%/16)THEN2080
2070 STRIG(0)ON:INTERVALON:RETURN
2080 LINE(X%,Y%-16)-(X%+16,Y%-1),1,BF
2090 FORN=Y%-16TO0STEP-2
2100 PUTSPRITE5,(X%,N),7,4
2110 IFO(1)=X%ANDP(1)=N-14ANDF(1)=0OR
O(2)=X%ANDP(2)=N-14ANDF(2)=0ORO(3)=X%
ANDP(3)=N-14ANDF(3)=0THEN2220
2120 IFPOINT(X%+8,N-2)=7ORPOINT(X%,N-
2)=7THEN2140
2130 NEXTN
2140 SOUND1,15:SOUND8,10:SOUND7,254
2150 PUTSPRITE5,(X%,N),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(X%,N),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(X%,N),7,7:SOUND7
,255
2160 STRIG(0)ON:INTERVALON:RETURN
2170 LINE(X%,Y%-16)-(X%+16,Y%-1),1,BF
2180 SOUND7,254
2190 PUTSPRITE5,(X%,Y%-16),7,5:FORB=0
TO30:NEXTB:PUTSPRITE5,(X%,Y%-16),7,6:
FORB=0TO30:NEXTB:PUTSPRITE5,(X%,Y%-16
),7,7:SOUND7,255
2200 STRIG(0)ON:INTERVALON:RETURN
2220 SOUND8,10:SOUND7,254
2230 PUTSPRITE5,(X%,N),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(X%,N),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(X%,N),7,7:SOUND7
,255
2240 IFO(1)=X%ANDP(1)=N-14THENF(1)=1:
PUTSPRITE2,(O(1),P(1)),1,7:GOSUB8500
2250 IFO(2)=X%ANDP(2)=N-14THENF(2)=1:
PUTSPRITE3,(O(2),P(2)),1,7:GOSUB8500
2260 IFO(3)=X%ANDP(3)=N-14THENF(3)=1:
PUTSPRITE4,(O(3),P(3)),1,7:GOSUB8500
2270 STRIG(0)ON:INTERVALON:GOTO700
2300 IFPOINT(X%+23,Y%+8)=7ANDPOINT(X%
+39,Y%+8)=7THEN2420
2310 IFPOINT(X%+23,Y%+8)=7ANDY%/16=IN
T(Y%/16)THEN2330
2320 STRIG(0)ON:INTERVALON:RETURN
2330 LINE(X%+16,Y%)-(X%+32,Y%+16),1,B
F
2340 FORN=X%+16TO239STEP2
2350 PUTSPRITE5,(N,Y%),7,4
2360 IFP(1)=Y%ANDO(1)=N+14ANDF(1)=0OR
P(2)=Y%ANDO(2)=N+14ANDF(2)=0ORP(3)=Y%
ANDO(3)=N+14ANDF(3)=0THEN2460
2370 IFPOINT(N+18,Y%+8)=7ORPOINT(N+18
,Y%)=7THEN2390
2380 NEXTN
2390 SOUND1,15:SOUND8,10:SOUND7,254
2400 PUTSPRITE5,(N,Y%),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(N,Y%),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(N,Y%),7,7:SOUND7
,255
2410 STRIG(0)ON:INTERVALON:RETURN
2420 LINE(X%+16,Y%)-(X%+32,Y%+16),1,B
F
2430 SOUND1,15:SOUND8,10:SOUND7,254
2440 PUTSPRITE5,(X%+16,Y%),7,5:FORB=0
```

LISTINGS

```
TO30:NEXTB:PUTSPRITE5,(X%+16,Y%),7,6:
FORB=0TO30:NEXTB:PUTSPRITE5,(X%+16,Y%
),7,7:SOUND7,255
2450 STRIG(0)ON:INTERVALON:RETURN
2460 SOUND1,15:SOUND8,10:SOUND7,254
2470 PUTSPRITE5,(N,Y%),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(N,Y%),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(N,Y%),7,7:SOUND7
,255
2480 IFP(1)=Y%ANDO(1)=N+14THENF(1)=1:
PUTSPRITE2,(O(2),P(1)),1,7:GOSUB8500
2490 IFP(2)=Y%ANDO(2)=N+14THENF(2)=1:
PUTSPRITE3,(O(3),P(2)),1,7:GOSUB8500
2500 IFP(3)=Y%ANDO(3)=N+14THENF(3)=1:
PUTSPRITE4,(O(4),P(3)),1,7:GOSUB8500
2510 STRIG(0)ON:INTERVALON:RETURN
2600 IFPOINT(X%+8,Y%+23)=7ANDPOINT(X%
+8,Y%+37)=7THEN2720
2610 IFPOINT(X%+8,Y%+23)=7ANDX%/16=IN
T(X%/16)THEN2630
2620 STRIG(0)ON:INTERVALON:RETURN
2630 LINE(X%,Y%+16)-(X%+16,Y%+32),1,B
F
2640 FORN=Y%+16TO166STEP2
2650 PUTSPRITE5,(X%,N),7,4
2660 IFO(1)=X%ANDP(1)=N+14ANDF(1)=0OR
O(2)=X%ANDP(2)=N+14ANDF(2)=0ORO(3)=X%
ANDP(3)=N+14ANDF(3)=0THEN2760
2670 IFPOINT(X%+8,N+18)=7ORPOINT(X%,N
+18)=7THEN2690
2680 NEXTN
2690 SOUND1,15:SOUND8,10:SOUND7,254
2700 PUTSPRITE5,(X%,N),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(X%,N),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(X%,N),7,7:SOUND7
,255
2710 STRIG(0)ON:INTERVALON:RETURN
2720 LINE(X%,Y%+16)-(X%+16,Y%+32),1,B
F
2730 SOUND7,254
2740 PUTSPRITE5,(X%,Y%+16),7,5:FORB=0
TO30:NEXTB:PUTSPRITE5,(X%,Y%+16),7,6:
FORB=0TO30:NEXTB:PUTSPRITE5,(X%,Y%+16
),7,7:SOUND7,255
2750 STRIG(0)ON:INTERVALON:RETURN
2760 SOUND8,10:SOUND7,254
2770 PUTSPRITE5,(X%,N),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(X%,N),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(X%,N),7,7:SOUND7
,255
2780 IFO(1)=X%ANDP(1)=N+14THENF(1)=1:
PUTSPRITE2,(O(1),P(1)),1,7:GOSUB8500
2790 IFO(2)=X%ANDP(2)=N+14THENF(2)=1:
PUTSPRITE3,(O(2),P(2)),1,7:GOSUB8500
2800 IFO(3)=X%ANDP(3)=N+14THENF(3)=1:
PUTSPRITE4,(O(3),P(3)),1,7:GOSUB8500
2810 STRIG(0)ON:INTERVALON:GOTO700
2900 IFPOINT(X%-8,Y%+7)=7ANDPOINT(X%-
24,Y%+7)=7THEN3020
2910 IFPOINT(X%-8,Y%+7)=7ANDY%/16=INT
(Y%/16)THEN2930
2920 STRIG(0)ON:INTERVALON:RETURN
2930 LINE(X%-16,Y%)-(X%-1,Y%+16),1,BF
2940 FORN=X%-16TO0STEP-2
2950 PUTSPRITE5,(N,Y%),7,4
2960 IFP(1)=Y%ANDO(1)=N-14ANDF(1)=0OR
P(2)=Y%ANDO(2)=N-14ANDF(2)=0ORP(3)=Y%
ANDO(3)=N-14ANDF(3)=0THEN3050
2970 IFPOINT(N-2,Y%+8)=7ORPOINT(N-2,Y
%)=7THEN2990
2980 NEXTN
2990 SOUND1,15:SOUND8,10:SOUND7,254
3000 PUTSPRITE5,(N,Y%),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(N,Y%),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(N,Y%),7,7:SOUND7
,255
3010 STRIG(0)ON:INTERVALON:RETURN
3020 SOUND1,15:SOUND8,10:SOUND7,254
3025 LINE(X%-16,Y%)-(X%-1,Y%+16),1,BF
3030 PUTSPRITE5,(X%-16,Y%),7,5:FORB=0
TO30:NEXTB:PUTSPRITE5,(X%-16,Y%),7,6:
FORB=0TO30:NEXTB:PUTSPRITE5,(X%-16,Y%
),7,7:SOUND7,255
3040 STRIG(0)ON:INTERVALON:RETURN
3050 SOUND1,15:SOUND8,10:SOUND7,254
3060 PUTSPRITE5,(N,Y%),7,5:FORB=0TO30
:NEXTB:PUTSPRITE5,(N,Y%),7,6:FORB=0TO
30:NEXTB:PUTSPRITE5,(N,Y%),7,7:SOUND7
,255
3070 IFP(1)=Y%ANDO(1)=N-14THENF(1)=1:
PUTSPRITE2,(O(2),P(1)),1,7:GOSUB8500
3080 IFP(2)=Y%ANDO(2)=N-14THENF(2)=1:
PUTSPRITE3,(O(3),P(2)),1,7:GOSUB8500
3090 IFP(3)=Y%ANDO(3)=N-14THENF(3)=1:
PUTSPRITE4,(O(4),P(3)),1,7:GOSUB8500
3100 STRIG(0)ON:INTERVALON:RETURN
8000 STRIG(0)OFF:INTERVALOFF
8001 PUTSPRITE2,(64,0),3,8
8002 PUTSPRITE3,(16,160),3,8
8003 PUTSPRITE4,(224,160),3,8
8005 SOUND7,254
8010 FORN=1TO140STEP10
8015 SOUND8,15-N/10:SOUND1,RND(1)*255
8020 PUTSPRITE1,(X%,Y%),6,2
8030 FORM=0TON:NEXTM:SOUND1,RND(1)*25
5
8040 PUTSPRITE1,(X%,Y%),6,0
8050 FORM=0TON:NEXTM:SOUND1,RND(1)*25
5
8060 PUTSPRITE1,(X%,Y%),6,3
8070 FORM=0TON:NEXTM:SOUND1,RND(1)*25
5
8080 PUTSPRITE1,(X%,Y%),6,1
8090 FORM=0TON:NEXTM:SOUND1,RND(1)*25
5
8100 NEXTN
8110 SOUND7,255
8120 LI=LI-1
8130 IFLI=-1THEN8200
8140 PRESET(152,184):COLOR1:PRINT#1,L
I+1:PRESET(152,184):COLOR11:PRINT#1,L
I
8150 STRIG(0)ON:GOTO630
8200 SCREEN3
8210 PRESET(65,35):PRINT#1,"GAME"
8220 PRESET(65,70):PRINT#1,"OVER"
8230 IFSC>HITHENPRESET(8,120):PRINT#1
,"NEW HIGH":HI=SC
8240 FORN=0TO3000:NEXTN
8250 SCREEN2,2,0:CLS
8260 GOTO80
```

```
8300 STRIG(0)OFF:INTERVALOFF:SCREEN3,
2
8310 TM=TM-3:LE=LE+1:SC=SC+1000
8320 IFTM<22THENTM=22
8330 PRESET(55,55):PRINT#1,"LEVEL"
8340 PRESET(85,100):PRINT#1,LE
8345 PUTSPRITE1,(16,16),3,6
8350 FORN=0TO1000:NEXTN
8360 GOTO360
8500 PRESET(64,184):COLOR1:PRINT#1,SC
8510 SC=SC+100
8520 PRESET(64,184):COLOR11:PRINT#1,S
C
8530 RETURN
8600 SCREEN0,0,1:COLOR15,4,4:END
8999 END
9000 FORN=0TO8
9010 FORM=1TO32
9020 READA$
9030 S$=S$+CHR$(VAL("&B"+A$))
9040 NEXTM
9050 SPRITE$(N)=S$:S$="":NEXTN:RETURN
9060 DATA00000011,00001100,00010000,0
0011000,00100000,00100000,00100100,00
101010,00110101,00101010,01010100,001
01001,00010111,00000111,00000111,0000
0111
9070 DATA11100000,00011000,01000100,1
0000010,10110011,01100010,00000010,00
011110,00111110,01111110,11111110,111
11100,11111000,01110000,01110000,1111
1000
9080 DATA00000111,00011000,00100010,0
1000001,11001101,01000110,01000000,01
111000,01111100,01111110,01111111,001
11111,00011111,00001110,00001110,0001
1111
9090 DATA11000000,00110000,00001000,0
0011000,00000100,00000100,00100100,01
010100,10101100,01010100,00101010,100
10100,11101000,11100000,11100000,1110
0000
9100 DATA00000011,00001100,00010000,0
0010000,00100110,00110001,00110000,00
111000,00111000,00111100,00111100,010
11110,00101111,00010111,00000111,0000
1111
9110 DATA11100000,00011000,00000100,0
0000100,00110010,11000110,00000110,00
001110,00001110,00011110,00011110,001
11101,11111010,01110100,01110000,0111
1000
9120 DATA00000011,00001100,00010010,0
0010100,00100001,00100000,00110001,00
110011,00111011,00110111,00101111,010
10111,00101111,00010111,00000111,0000
1111
9130 DATA11100000,00011000,10100100,1
0010100,11000010,00000010,11000110,11
100110,11101110,11110110,11111010,111
10101,11111010,01110100,01110000,0111
1000
9140 DATA00000000,00011111,00111111,0
1110011,01101111,01101111,01111111,01
111111,01111111,01111111,01101111,011
01111,01110011,00111111,00011111,0000
0000
```

```
9150 DATA00000000,11111000,11111100,1
1001110,11110110,11110110,11111110,11
111110,11111110,11111110,11110110,111
10110,11001110,11111100,11111000,0000
0000
9160 DATA00000000,00000110,00111111,0
1110011,00101011,01101101,00011111,01
111110,00110110,00110111,01100100,011
00111,01110011,00111001,00011001,0000
0000
9170 DATA00000000,11110000,11011100,1
1001110,11110100,00110100,11111110,01
011010,11011110,11111100,11010110,011
10110,01001100,01111100,11000000,0000
0000
9180 DATA00000000,00000010,00101100,0
1110010,00001001,01001000,00011001,01
101000,00000110,00110100,01000000,010
00101,00110010,01000000,00100001,0000
0000
9190 DATA00000000,11000000,10010100,0
1001010,11000000,00010000,11001010,00
001000,01001100,00000000,00000100,010
00010,01001000,00001100,01000000,0000
0000
9200 DATA00000000,00000000,00000000,0
0000000,00000000,00000000,00000000,00
000000,00000000,00000000,00000000,000
00000,00000000,00000000,00000000,0000
0000
9210 DATA00000000,00000000,00000000,0
0000000,00000000,00000000,00000000,00
000000,00000000,00000000,00000000,000
00000,00000000,00000000,00000000,0000
0000
9220 DATA00000000,00000000,00000000,0
0000111,00011111,00111111,01111001,01
111001,01111111,01110111,00111000,000
11111,00000111,00000000,00000000,0000
0000
9230 DATA00000000,00000000,00000000,1
1100000,11111000,11111100,10011110,10
011110,11111110,11101110,00011100,111
11000,11100000,00000000,00000000,0000
0000
9240 DATA16,16,16,32,16,48,32,16,48,1
6,48,32,48,48,48,64,48,80
9250 DATA16,96,16,112,32,112,16,128,3
2,128,48,128,80,128
9260 DATA80,0,80,16,80,32,80,48,96,16
,112,16,128,16
9270 DATA80,80,80,96,96,96,96,128,112
,128,96,144,112,144,96,160,112,160
9280 DATA112,48,128,48,112,64,128,64,
144,48,160,48,160,64,160,80,160,96,14
4,96,128,96,176,96
9290 DATA176,112,144,112,144,128,144,
144,160,144,176,144,192,144,208,144,2
08,160,192,160,176,160
9300 DATA208,128,208,112,240,160,240,
144,240,128,240,112,240,96,240,80,224
,80
9310 DATA224,0,240,0,224,16,240,16,19
2,16,192,32,192,48,208,48,224,48,160,
0,160,16
```

LISTINGS

ALPHA 1 by S Irving

This is another example of how you can get an interesting game out of a fairly short listing. Any resemblance to *Space Invader* type games is purely coincidental. The point here is to defend your space station (does this sound familiar?) with judicious use of an Alpha 1 space cannon. This is, of course, the latest type of galactic weaponry, with automatic fire. But it does need aiming, and this is where your left and right cursor keys come in. Each time you manage to blow up an alien ship, it's replaced by a faster one — this is not going to be an easy battle!

Be careful when typing in the DATA statements, as mistakes are easily made here. The @ symbol in line 145 is what our printer produced instead of a graphics character. You can select a character to suit your own taste.

```
5 REM* ALPHA 1  BY S.IRVING *
10 B=5:N=3:SC=0
20 KEY OFF
30 COLOR1,15,15
40 SCREEN 1,2
45 LOCATE 5,10:PRINT"PRESS 'S' TO STA
RT                    ALPHA 1 ":IF INKEY$
="S" THEN CLS:GOTO 50
46 GOTO 45
50 PLAY "M1100V15T25507S12CEFGFEC","M
1100V15T25503S8CEFGFEC":PLAY "M1100V1
5T25503S8CEFGFEC","M1100V15T25503S8C
EFGFEC"
55 DATA 3,7,3,1,1,1,3,35,119,119,127,
119,113,115,119,7,192,224,192,128,128
,128,192,196,238,238,254,238,142,206,
238,224
60 FOR Y= 1TO3
70 A$=""
80 FORX= 1TO32:READ D
90 A$=A$+CHR$ (D)
100 NEXT X:SPRITE$(Y)=A$:NEXT Y
110 DATA 1,3,1,0,0,0,0,0,0,0,0,0,0,0,
0,0,128,192,128,0,0,0,0,0,0,0,0,0,0,0
,0,0
120 DATA 0,0,0,1,7,31,117,255,213,255
,55,27,15,1,0,0,0,0,0,128,224,248,94,
255,85,255,236,216,240,128,0,0
```

```
130 SPRITE ON : ON SPRITE GOSUB 2000
140 Y=100:X=175:R=8
145 LOCATE 0,21:PRINT"@@@@@@@@@@@@@@@
@@@@@@@@@@@@@"
150 LOCATE 0,0:COLOR 4:PRINT"SCORE ";
SC
155 T=STICK(0)
160 IF T=7 THEN Y=Y-2.5
170 IF T=3 THEN Y=Y+2.5
180 GOSUB 1000
190 PUT SPRITE 1,(Y,X),13,1
200 PUT SPRITE 2,(B,R),8,3
230 B=B+N:IF B>255 THEN B=0:R=R+20:IF
 R>160 THEN GOTO 3000
240 GOTO 150
1000 PUT SPRITE 3,(Y,Z),1,2
1010 Z=Z-8:IF Z<0 THENZ=170
1020 RETURN
2000 SOUND 0,0:SOUND 6,250:SOUND 7,82
:SOUND 2,130:SOUND 8,16:SOUND 13,0:SC
=SC+1:B=10:R=10:N=N+.02:RETURN
3000 SOUND 6,15:SOUND 7,7:SOUND 8,16:
SOUND 9,16:SOUND 10,16:SOUND 11,0:SOU
ND 12,16:SOUND 13,0
3010 SCREEN 0:COLOR 1:LOCATE 4,10:PRI
NT"THE ALIEN'S DESTROYED ALPHA 1":FOR
T=0TO999:NEXT T
3020 RUN
```

ADDRESS BOOK by Douglas Leach

This program is for the fortunate owners of Sony disk drives. Although, at first sight, it seems just another very simple database program, there is actually something rather interesting about it. The fact is that it uses *random access files*, which are more economical in terms of disk space than sequential ones. This is mostly because they are stored in binary form, rather than the ASCII format used by standard sequential files.

Random access files deserve an entire article of their own, as they are rather more complex to use than sequential ones, but for now we'll content ourselves with looking at the main commands and structures.

The **OPEN "file" AS # 1** must first be used, and then, in this example, the random space buffer is allocated specifically to string variables using the FIELD statement.

PUT # 1 and **GET # 1, REC%** is the means by which the desired record is written on to, and read from the disk buffer. **INPUT/PRINT NME$:PRINT PCD$** are used to access and place the data inside the buffer. The LOC statement can be used to identify the current record.

To keep the program as simple as possible, there are no number examples — only strings are used. You might like to try adding a sort routine to re-order the data in memory.

```
5 REM D C LEACH
10 KEY OFF:SCREEN0:COLOR 15,1,1:CLS
20 LOCATE 10,10:PRINT"ACCESSING DISK"
30  OPEN"file" AS #1:'FILE COULD BE A
NY NAME
40  FIELD#1,20 AS N$,20 AS B$,20 AS C
$,20 AS D$,20 AS E$,8 AS A$,8 AS P$
50 CLS:'SET UP MENU
60  PRINT"XWWWWWWWWWWWWWWWWWWWWWWWW
WWWWWWWWY
70  FORI=1TO20:PRINT"V
                  V":NEXTI
```

```
80  PRINT"ZWWWWWWWWWWWWWWWWWWWWWWWWW
WWWWWWWW[
90 LOCATE16,2:PRINT"MENU"
100 LOCATE 10,10:PRINT"<1> ENTER NEW
RECORD"
110 LOCATE 10,12:PRINT"<2> FIND RECOR
D"
120 LOCATE 10,14:PRINT"<3> END ACCESS
"
130 AN$= INKEY$:AN=VAL(AN$)
140 ON AN GOTO 170,490,530
```

```
150 IF AN$=""THEN 130
160 LOCATE 10,22:PRINT"
        ":'RE-WRITE GET RECORD LINE
170 CLS
180 LOCATE10,0 : PRINT" <LAST REC.>";
LOC(1):LOCATE 10,22 : PRINT"ENTER '0'
 TO END."
190 LOCATE 10,23:INPUT"Record code";R
EC%
200 IF REC%=0 THEN CLS:GOTO 50:'RETUR
N TO MENU
210 LOCATE 10,6 :INPUT"NAME  ";NME$
220 LOCATE 10,8 :INPUT"ADDR1 ";A1$
230 LOCATE 10,10:INPUT"ADDR2 ";A2$
240 LOCATE 10,12:INPUT"ADDR3 ";A3$
250 LOCATE 10,14:INPUT"ADDR4 ";A4$
260 LOCATE 10,16:INPUT"P/CDE ";PC$
270 LOCATE 10,18:INPUT"PHONE ";TEL$:P
RINT
280 LSET N$=NME$
290 LSETB$=A1$
300 LSETC$=A2$
310 LSETD$=A3$
320 LSETE$=A4$
330 LSET A$=PC$
340 LSET P$=TEL$
350 PUT#1,REC%
```

```
360 GOTO 160
365 '
370 ' RECALL DATA
380 '
390 CLS
400 GET#1,REC%
410 LOCATE10,0:PRINT" <LAST REC.->";L
OC(1)
420 LOCATE 10,6 : PRINT"NAME    ";N$
430 LOCATE 10,8 :PRINT"ADDR1   ";B$
440 LOCATE 10,10:PRINT"ADDR2   ";C$
450 LOCATE 10,12:PRINT"ADDR3   ";D$
460 LOCATE 10,14:PRINT"ADDR4   ";E$
470 LOCATE 10,16:PRINT"PCODE   ";A$
480 LOCATE 10,18:PRINT"PHONE   ";P$
490 LOCATE 10,22:PRINT"ENTER '0' TO E
ND."
500 LOCATE 10,23:INPUT"Record code";R
EC%
510 IF REC%=0THEN CLS:GOTO 50
520 GOTO 390
530 CLOSE#1
540 CLS:LOCATE 14,10:PRINT"GOODBYE"
550 FOR DELAY = 1 TO 2000:NEXT DELAY:
COLOR 15,4,4:KEY ON
560 END
```

CHOPPER
by Tom Bannister

Here the idea is to take your helicopter up to its maximum ceiling, avoiding other air traffic on the way, and stay there until you have just enough fuel left to make a safe landing. Here's how the program breaks down:

80-120	Sprite data
130	Position fixed
140-250	Main sprite movement
260-340	Puts sprites in position
350-390	Limits main sprites movements
410	Adds score
430-460	Time subtractor
490-760	Crash sequence
810-870	Time line
880-1090	First screen for instructions
1100-1180	Instructions if you try to land
1190-1260	Congratulations and score

```
5 'AVAGO by Tom Bannister
10 SCREEN2,2:COLOR 15,1,2
20 OPEN "GRP:"AS #1:S%=S%
30 GOSUB 880
40 GOSUB 810
50 ON SPRITE GOSUB 490
60 SPRITE ON
70 U=215
80 A$=CHR$(&H0)+CHR$(&H0)+CHR$(&H0)+C
HR$(&HFF)+CHR$(&H1)+CHR$(&H1)+CHR$(&H
3)+CHR$(&H7)
90 B$=CHR$(&H2F)+CHR$(&H4F)+CHR$(&H2F
)+CHR$(&H4)+CHR$(&HA)+CHR$(&H1F)+CHR$
(&H0)+CHR$(&H0)
100 C$=CHR$(&H0)+CHR$(&H0)+CHR$(&H0)+
CHR$(&HFE)+CHR$(&H0)+CHR$(&H0)+CHR$(&
H80)+CHR$(&HC3)
110 D$=CHR$(&HFF)+CHR$(&HE0)+CHR$(&HC
0)+CHR$(&H0)+CHR$(&H0)+CHR$(&HC0)+CHR
$(&H0)+CHR$(&H0)
120 SPRITE$(1)=A$+B$+C$+D$
130 X=80:Y=176:B=30:C=37:E=55:F=60:G=
85:H=88:I=130:J=110:K=150:L=147 :M=19
0:N=160 :T=220:P=122
140 FOR I=ITOI
```

```
150 D=STICK (1)ORSTICK (0)
160 IF D=(0)THEN ZX=0:ZY=0: GOSUB430
170 IF D=(1)THEN ZX=0:ZY=-2:GOSUB 430
180 IF D=(2)THEN ZX=1+2:ZY=-2:GOSUB 4
30
190 IF D=(3)THEN ZX=2:ZY=0:GOSUB 430
200 IF D=(4)THEN ZX=2:ZY=1+2:GOSUB 43
0
210 IF D=(5)THEN ZX=0:ZY=1+2:GOSUB 43
0
220 IF D=(6)THEN ZX=-2:ZY=1+2:GOSUB 4
30
230 IF D=(7)THEN ZX=-2:ZY=0:GOSUB 430
240 IF D=(8)THEN ZX=-2:ZY=-2:GOSUB 43
0
250 IF D=(3)THEN ZX=2:ZY=0:GOSUB 430
260 PUT SPRITE(1),(X,Y),11,1
270 PUT SPRITE(3),(E,F),9,1
280 PUT SPRITE(4),(G,H),9,1
290 PUT SPRITE(5),(I,J),7,1
300 PUT SPRITE(6),(K,L),2,1
310 PUT SPRITE(7),(M,N),13,1
320 PUT SPRITE(8),(T,P),15,1
330 PUT SPRITE(9),(K,F),14,1
340 PUT SPRITE(2),(B,C),3,1
```

LISTINGS

```
350 X=X+ZX:Y=Y+ZY
360 IF X<5 THENX=5
370 IF X>230 THEN X=230
380 IF Y<10THENY=10
390 IF Y>180 THEN Y=180
400 B=B-8:E=E-5:G=G-10:I=I-8:K=K-5:M=
M-9:T=T-6:CD=+8
410 IF Y<11 THEN S%=S%+1
420 NEXT I
430 U=U-1
440 XU=24+INT(U/2)*2
450 DRAW"C1BM=XU;,9D2"
460 IF U<=0 THEN 490
470 IFY>178THEN 1100
480 RETURN
490 A$="V901L32F+CF+CF+CF+CF+C"
500 B$="V904L32F+CF+CF+CF+CF+C"
510 C$="V908L32F+CF+CF+CF+CF+C"
520 PLAY A$,B$,C$
530 PLAY"L64S14M11108C07BB-AA-GG-FEE-
DD-CC-B-AA-GG-FEE-DD-CBB-AA-GG-FEE-DD
-C"
540 FOR I=1TO32
550 PUT SPRITE 1,(X,Y),15
560 CIRCLE(X+4,Y+4),RND(1)*5,14,,,.5+
RND(1)
570 PAINT(X+4,Y+4),14
580 CIRCLE(X+2,Y+2),RND(1)*6,1,,,.15+
RND(1)
590 Y=Y+7:X=X
600 IF Y>172THEN 620
610 NEXT
620 PUT SPRITE 1,(X,Y),15
630 FORL=1TO40
640 CIRCLE(X+6,Y+8),RND(1)*6,6,,,.5+R
ND(1)
650 CIRCLE(X+6,Y+8),RND(1)*6,11,,,.5+
RND(1)
660 NEXT
670 COLOR 15
680 DRAW "BM12,20"
690 PRINT#1," YOU     HAVE  CRASHED"
700 DRAW "BM15,30"
710 PRINT#1,"TO PLAY AGAIN PRESS TRIG
GER          OR KEY ""P"""
720 DRAW "BM23,180":PRINT#1,"SCORE 0"
730 IF STRIG (1) THEN GOTO  770
740 F$=INKEY$
750 IF F$="P" THEN GOTO 770
760 GOTO 730
770 CLOSE #1
780 COLOR 15
790 CLS
800 RUN
810 LINE(23,8)-(240,12),1,BF
820 LINE(23,9)-(238,11),11,BF
830 COLOR 15
840 FF=175
850 DRAW"BM211,13"
860 PRINT#1,"TIME"
870 RETURN
880 SCREEN 2:COLOR 15,1,2
890 A$="V10L1603CDEFGFEDC":B$="V10L16
CDEFGFEDC"
900 PLAY A$,B$
910 DRAW "BM30,80"
920 PRINT #1,"   HELICOPTER GAME "
930 FOR XX=1TO6
940 CIRCLE(50,50),RND(1)*20,RND(1)*15
,,,,05
950 DRAW "BM30,100"
960 PRINT#1,"SEE IF YOU CAN REACH THE

      TOP AND BACK AGAIN  "
970 DRAW"BM30,130":PRINT#1,"STAY AT T
HE TOPFOR A GOOD        SCORE,BUT LEAV
E ENOUGH TIME           TO LAND SAFELY
"
980 CIRCLE(175,50),RND(1)*20,RND(1)*1
5,,,10
990 CIRCLE(50,50),RND(1)*20,RND(1)*15
,,,10
1000 CIRCLE(175,50),RND(1)*20,RND(1)*
15,,,,05
1010 DRAW "BM39,178"
1020 PRINT#1,"JOY STICK OR CURSER KEY-
S   "
1030 GG=30
1040 PSET (G,160)
1050 PRINT#1,"-=O=-":COLOR RND(1)*15
1060 G=G+45
1070 NEXT XX
1080 CLS
1090 RETURN
1100 IF S%=0 THENDRAW"BM15,30":PRINT#
1,"YOU MUST GO UP TO THE TOP        T
O SCORE                          PRESS
TRIGGER OR KEY P"
1110 IF S%>0 GOTO 1190
1120 DRAW"BM23,180":PRINT#1,"SCORE";S
%
1130 B$="V12S14M200L805A04E05A04E05A0
4E05A04E05A04E"
1140 C$="V12S14M200L805A-04E-05A-04E-
05A-04E-05A-04E-05A-04E-"
1150 PLAY B$,C$
1160 IF STRIG (1) GOTO770
1170 F$=INKEY$:IF F$="P"THEN GOTO770
1180 GOTO 1160
1190 DRAW"BM15,30":PRINT#1,"WELL DONE
 YOU HAVE BEAT THE      SET TIME. TO P
LAY AGAIN PRESS         TRIGGER OR KEY
P"
1200 PLAY"V13S8M5000L1604GL8EL16EL8FL
1604GL805EL16EL4C"
1210 DRAW"BM23,180":PRINT#1,"SCORE";S
%
1220 IF STRIG (1) GOTO1260
1230 F$=INKEY$
1240 IF F$="P" THEN GOTO 1260
1250 GOTO 1220
1260 RUN
```

DYNAMINTE DENNIS
by Robert Bonam

In spite of his name, Dynamite Dennis isn't too bright. In fact, he keeps falling down holes. What doesn't help is that the ground keeps moving about on several different levels. Fortunately for Dennis he has you to help him get through the holes in the ground. But watch out — if you bang his head, he dies. And to complicate matters, there are bundles of dynamite flying about the place which, as you might expect, can also prove fatal. Each hole you get through gains you ten points, and completing a screen gives you a hundred. When selecting options, use upper case characters.

```
10 REM      ****************
20 REM      *               *
30 REM      * DYNO-DENNIS   *
40 REM      * 1985  BY      *
50 REM      * R.BONAM       *
60 REM      *               *
70 REM      ****************
80 REM * ALL OPTIONS SHOULD BE TYPED
IN            UPPER CASE CHARACTERS *
90 COLOR 1,15,15:ONSTOPGOSUB1280:STOP
ON
100 OPEN"GRP:"AS#1:Q=0:GOSUB770
110 HI=0:H$="M S X"
120 SCREEN2,2:LI=3:S=0:SC=0:SF=0
130  RESTORE140:S$="":FORF=0TO31:READ
D:S$=S$+CHR$(D):NEXT:SPRITE$(2)=S$
140  DATA 0,0,1,3,15,63,127,239
150  DATA 199,239,108,109,61,31,15,3
160  DATA 48,200,192,192,240,252,254,
247
170 DATA227,247,54,182,188,248,240,19
2
180 BX=100:BY=133
190 L1=40:L2=90:L3=40:L4=90:X=200:Y=1
33
200 COLOR1,15,15:CLS
210 LINE(0,30)-(257,40),6,BF
220 LINE(0,70)-(257,80),6,BF
230 LINE(0,110)-(257,120),6,BF
240 LINE(0,150)-(257,160),6,BF
250 RESTORE260:S$="":FORF=0TO31:READD
:S$=S$+CHR$(D):NEXT:SPRITE$(1)=S$
260 DATA 15,79,63,9,11,30,60,63
270 DATA 63,63,63,47,6,6,30,62
280 DATA 240,242,252,144,176,120,60,2
52
290 DATA 252,252,252,244,96,96,120,12
4
300 PSET(20,180),7:PRINT#1,"LIVES:";L
I
310 DRAW"BM20,0":PRINT#1,"SCORE:"
320 DRAW"BM70,0":PRINT#1,USING"####";
SC;
330 PUTSPRITE1,(X,Y),1
340 ONSPRITEGOSUB710:SPRITEON
350 S=STICK(Q):IFS=0THENGOSUB480:GOSU
B720
360 IFS=7THENX=X-4
370 IFS=3THENX=X+4
380 IFS=1THENU=40:GOTO620
390 PUTSPRITE1,(X,Y),1
400 GOSUB480:GOSUB720
410 IFPOINT(X,Y+20)<>6THENY=Y+40
420 IFY>190THEN710
430 IFX<10THENX=250
440 IFX>250THENX=10
450 IFY<5THENX=200:Y=133:SF=SF+1:SC=S
C+100:LINE(70,0)-(120,10),0,BF:GOTO32
0
460 GOTO350
470 GOTO470
480 L1=L1+2:IFL1-40>250THENL1=10
490 LINE(L1,30)-(L1-30,40),15,BF
500 LINE(L1-30,30)-(L1-60,40),6,BF
510 L2=L2-2:IFL2+40<10THENL2=250
520 LINE(L2,70)-(L2+30,80),15,BF
530 LINE(L2+30,70)-(L2+60,80),6,BF
540 L3=L3+2:IFL3-40>250THENL3=10
556 LINE(L3,110)-(L3-30,120),15,BF
560 LINE(L3-30,110)-(L3-60,120),6,BF
570 L4=L4-1:IFL4+40<10THENL4=250
580 LINE(L4,150)-(L4+30,160),15,BF
590 LINE(L4+30,150)-(L4+60,160),6,BF
600 GOSUB720
610 RETURN
620 REM ......... UP ..........
630 Y=Y-2:U=U-2
640 IFPOINT(X,Y)=6THEN710
650 IFPOINT(X+16,Y)=6THEN710
660 IFY<5THENSF=SF+1:X=200:Y=133:SC=S
C+100:LINE(70,0)-(120,10),0,BF:GOTO32
0
670 GOSUB480
680 IFU=0THENSC=SC+10:LINE(70,0)-(120
,10),0,BF:GOTO310
690 PUTSPRITE1,(X,Y),1
700 GOTO630
710 SPRITEOFF:LI=LI-1:IFLI<0THEN1050E
LSECOLOR 1,15:GOTO130
720 IFSF<1THENRETURNELSEBX=BX-SF:IFSF
>4THENSF=4
730 IFBX<10THENBY=BY-40:BX=250
740 IFBY<40ANDBX<15THENBX=100:BY=133
750 PUTSPRITE2,(BX,BY),3
760 RETURN
770 CLS:SCREEN0:WIDTH40
780 PRINT"       DYNAMITE DENNIS"
790 PRINT
800 PRINT
810 PRINT"      (C) R.Bonam 1985"
820 PRINT:PRINT
830 PRINT"   JUMP THROUGH THE HOLES "
840 PRINT"   TO THE TOP OF THE SCREEN
 "
850 PRINT
860 PRINT"   AVOID THE DYNAMITE AFTER
 THE SECOND"
870 PRINT"   SCREEN.":PRINT:PRINT
880 PRINT"   10 POINTS ARE AWARDED EV
ERY TIME YOU"
890 PRINT"   JUMP THROUGH A HOLE."
900 PRINT
910 PRINT"   YOU LOSE A LIFE IF YOU F
ALL TO"
920 PRINT"   TO THE BOTTOM,HIT YOUR H
EAD"
930 PRINT"   OR BUMP INTO THE DYNAMIT
E."
940 KEYOFF
```

LISTINGS

```
950 A$="      DYNO DENNIS....R.Bonam..
.....'S' TO START.....'J' TO SET JOYS
TICK."
960 LOCATE2,20
970 FORI=1TOLEN(A$)
980 PRINTTAB(2)MID$(A$,I,30)
990 LOCATE2,20
1000 FORK=1TO100:NEXT
1010 K$=INKEY$:IFK$=""THENNEXT:GOTO96
0
1020 IFK$="S"THENRETURN
1030 IFK$="J"THENQ=1
1040 NEXT
1050 CLS:SCREEN0
1060 PRINT"  OH DEAR !"
1070 PRINT:PRINT
1080 PRINT" YOU HAVE LOST ALL YOUR LI
VES"
1090 PRINT:PRINT:IFSC>HITHEN1190
1100 PRINT"   YOU HAVE SCORED:"SC
1110 PRINT:PRINT
1120 PRINT"   THE HI-SCORE IS:"HI
1130 PRINT
1140 PRINT"   BY:"H$
1150 PRINT:PRINT
1160 PRINT"   PRESS 'S' TO PLAY AGAIN
"
1170 A$=INKEY$:IFA$<>"S"THEN1170
1180 GOTO120
1190 CLS
1200 HI=SC:PRINT"     *  NEW HIGH SCOR
E  *"
1210 PRINT:PRINT:PRINT
1220 PRINT"    YOU SCORED:"SC
1230 PRINT:PRINT
1240 PRINT"    PLEASE ENTER YOUR NAME
"
1250 LOCATE5,10:INPUTH$:IFLEN(H$)>15T
HEN1190
1260 PRINT:PRINT
1270 PRINT"    YER DID GOOD "H$:GOTO1
150
1280 SCREEN0:CLS:COLOR 15,4,4
1290 PRINT"  BYE.."
1300 END
```

SPACE
by Glyn Johnson

Once again you're plunged into the middle of the universe in a bold attempt to defend truth, justice and the MSX way of life. This time you're in a spaceship (what again?) and your job is to catch up with another ship. Unfortunately, the alien craft has a hyperspace facility and keeps vanishing, only to reappear in another part of the galaxy. Unusually, you don't have to shoot the ship down, but just catch up with it — docking is much friendlier than zapping — and that's how you score points.

```
10 REM by Glyn Johnson,Halifax,9/2/85
20 CLS:SCREEN 1:COLOR 15,1,1
30 PRINT "SKILL LEVEL(1-4)
          1=EASY 4=HARD"
40 A$=INKEY$
50 IF A$="1"THEN AA=150:T=7:L=1
60 IF A$="2"THEN AA=130:T=8:L=2
70 IF A$="3"THEN AA=110:T=9:L=3
80 IF A$="4"THEN AA=90:T=10:L=4
90 IF A$=""THEN 40
100 SCREEN 2,3
110 U=1:M=1
120 J=INT(RND(1)*255)
130 K=INT(RND(1)*190)
140 PSET(J,K),15
150 U=U+1:IF U<130 THEN 120
160 FOR P=9 TO 1 STEP -1:CIRCLE(J,K),
P,9,,,1.7:NEXT P:M=M+1:IF M<>9 THEN 1
20
170 COLOR 1,1,1
180 S=0
190 T=5
200 A=100:B=100
210 KEY OFF
220 REM DEFINE SPRITES
230 SPRITE$(2)=CHR$(&H7E)+CHR$(&HFF)+
CHR$(&H18)+CHR$(&HFF)+CHR$(&H3C)
240 SPRITE$(1)=CHR$(&H3C)+CHR$(&H7E)+
CHR$(&H81)+CHR$(&H81)+CHR$(&HFF)+CHR$
(&H7E)+CHR$(&H24)+CHR$(&H42)
250 C=INT(RND(1)*255):D=INT(RND(1)*19
1)
260 SPRITE ON
270 PUT SPRITE 1,(C,D),15,2
280 FOR I=1 TO AA
290 PUT SPRITE 0,(A,B),3,1
300 D=STICK(0)
310 IF D=1 THEN B=B-1
320 IF D=2 THEN B=B-1:A=A+1
330 IF D=3 THEN A=A+1
340 IF D=4 THEN A=A+1:B=B+1
350 IF D=5 THEN B=B+1
360 IF D=6 THEN B=B+1:A=A-1
370 IF D=7 THEN A=A-1
380 IF D=8 THEN A=A-1:B=B-1
390 ON SPRITE GOSUB 430
400 NEXT I
410 T=T-1:IF T=0 THEN GOSUB 450
420 GOTO 250
430 S=S+1
440 GOTO 250
450 SCREEN 1
460 COLOR 15,1,1
470 PRINTTAB(3)"YOU SCORED";S;"ON LEV
EL";L;"":PRINT
480 PRINT TAB(5) "ANOTHER GAME?(Y/N)"
:PRINT
490 A$=INKEY$
500 IF A$="Y"OR A$="y" THEN CLS:GOTO
30
510 IF A$="N"OR A$="n"THEN PRINT" GOO
DBYE! THANKS FOR PLAYING":END
520 GOTO 490
```

BOMBER
by Terry Rewcastle

After pressing F5 to start the game, you're confronted with a view of a city which — yes, you guessed — you have to bomb into oblivion. This anti-social act has a reason. You have to clear the buildings out of the way so that you can land, as your aircraft gets lower on each pass. Good luck!

```
10 REM *** BOMBER ***
20 REM ** BY TERRY REWCASTLE **
30 CC=RND(-TIME)
40 SCREEN 1,2:KEY OFF
50 COLOR 9,5,1
60 HI=0
70 DEFINT A-Z
80 BM=100
90 GOSUB 230
100 GOSUB 270
110 GOSUB 320
120 X=0:X1=1:Y=0:Y1=8:R=0:CSR=0:HT=0:
TS=0:SC=0
130 GOSUB 390
140 ON INTERVAL=2 GOSUB 490
150 ON STRIG GOSUB 560
160 INTERVAL ON
170 STRIG(0) ON
180 PUT SPRITE1,(X,Y),1,1
190 GOSUB 910
200 LOCATE 0,0:PRINT"SCORE";SC+HI
210 IF SC=TS THEN GOSUB 820
220 GOTO 200
230 REM sprite definition
240 FOR I=1 TO 32:READ N:A$=A$+CHR$(N
):NEXT
250 SPRITE$(1)=A$
260 RETURN
270 REM color bomb & buildings
280 START=BASE(6)
290 VPOKE(START+1),21
300 VPOKE(START),229
310 RETURN
320 REM character definition
330 FOR P=1 TO 4
340 IF P=4THENP=8
350 FOR I=0 TO 7
360 READ N:VPOKE(BASE(7)+(P*8)+I),N
370 NEXT:NEXT
380 RETURN
390 REM position buildings
400 N=BASE(5)
410 FOR I=N+739 TO N+765
420 S=RND(1)*BM+150
430 FORH=I TO I-S STEP -32
440 VPOKE H,1:TS=TS+10
450 IF RND(1)*3<2 THEN VPOKE H-32,2 E
LSE VPOKE H-32,3
460 NEXT:BEEP:NEXT
470 TS=TS+270
480 RETURN
490 REM move sprite
500 X=X+X1:R=R+1:IFR=8 THEN R=0:CSR=C
SR+1
510 IF X=>256 THEN X=0:Y=Y+Y1
520 PUT SPRITE 1,(X,Y),1,1
530 BA=VPEEK(BASE(5)+CSR+34)
540 IF BA=1 OR BA=2 OR BA=3 THEN GOSU
B730
550 RETURN
560 REM drop bomb
570 G=0:STRIG(0)OFF
580 ON INTERVAL=2 GOSUB 490
590 INTERVAL ON
600 HT=CSR+33
610 IF HT>768 THEN GOTO 700
620 L=VPEEK(BASE(5)+HT)
630 IF L=1 OR L=2 OR L=3 THEN G=G+1:S
C=SC+10
640 VPOKE (BASE(5)+HT),8
650 FOR W=1TO10:NEXT
660 VPOKE (BASE(5)+HT),32
670 IF G=6 THEN GOTO 700
680 HT=HT+32
690 GOTO 610
700 REM crash routine
710 SOUND 2,1:SOUND 3,15:SOUND 9,15:F
ORW=1TO17:NEXT
720 SOUND 9,0:STRIG(0)ON:RETURN
730 STRIG(0)OFF:INTERVAL OFF
740 BEEP:SCREEN 0:COLOR 10,1,1:CLS
750 LOCATE 15,5
760 PRINT"CRASHED"
770 LOCATE 10,17
780 PRINT"FINAL SCORE:";SC+HI
790 LOCATE 10,19
800 PRINT"PRESS 'F5' TO PLAY AGAIN"
810 END
820 REM landed routine
830 BEEP:INTERVAL OFF:STRIG(0) OFF
840 LOCATE 15,15
850 PUT SPRITE 1,(0,0),1,1
860 PLAY"T250CDEFGABO5C"
870 PRINT"LANDED"
880 FOR K=1 TO 3500:NEXT:CLS
890 HI=HI+SC:BM=BM+50:IF BM>500THEN B
M=500
900 GOTO 120
910 SOUND 0,200 : SOUND 1,10 : SOUND
13,10
920 SOUND 7,&B10100100:SOUND 11,200
930 SOUND 12,0:SOUND 8,16
940 RETURN
950 DATA 0,0,131,192,224,255,255,255
960 DATA 31,15,0,0,0,0,0,0
970 DATA 0,0,192,0,34,250,254,254
980 DATA 250,250,0,0,0,0,0,0
990 DATA 255,195,195,195,195,195,255,
255
1000 DATA 24,24,60,90,219,219,219,255
1010 DATA 24,60,102,231,231,195,195,2
55
1020 DATA 231,102,24,24,60,60,60,24
```

LISTINGS

HANGMAN
by D M Wilson

It had to happen. Every computer has its version of Hangman, now here's one for MSX. It features impressive and colourful graphics. And there's a particularly nasty ending for the man on the screen should you fail to guess the word correctly. The words you have to guess are built into the program, but should you want to change them, and put in words of your own, then simply change the contents of the DATA statement in lines 1090 to 1150. The program makes especially good use of sprites, and the facility to fill shapes with colour.

```
5 REM HANGMAN by D M Wilson
10 COLOR15,1,1
30 SCREEN2,3
50 SX%=194:SY%=20
70 X%=15
90 WR=0:SC%=0
110 Z=RND(-TIME)
130 WO=INT(50*RND(1)+1)
150 DD$=""
170 GOSUB3170
190 DRAW"BM254,30;s4C13A0H20L22D11L4U
30R50D38"
210 PAINT(253,28),13
230 S$="":FORX=1TO32:READA$
250 S$=S$+CHR$(VAL("&H"+A$)):NEXTX
270 SPRITE$(3)=S$
290 DATA 3F,7F,E3,E3,E3,FF,FF,FC,FE,F
F,FF,DF,EF,F0,7F,3F,FC,FE,C7,C7,C7,FF
,FF,3F,7F,FF,FF,FB,F7,0F,FE,FC
310 T$="":FORX=1TO32:READA$
330 T$=T$+CHR$(VAL("&H"+A$)):NEXT
350 SPRITE$(2)=T$
370 DATA0,0,1C,1C,1C,0,0,0,0,0,0,0,0,
0,0,0,0,0,38,38,38,0,0,0,0,0,0,0,0,0,
0,0
390 Z$="":FORX=1TO32:READA$
410 Z$=Z$+CHR$(VAL("&H"+A$)):NEXT
430 SPRITE$(1)=Z$
450 DATA01,0,01,02,04,04,08,08,08,08,
08,04,03,0,0,0,0,80,80,40,20,20,10,10
,10,10,10,20,C0,0,0,0
470 LINE(15,35)-(145,45),6,BF
490 LINE(15,45)-(145,85),15,B
510 OPEN"GRP:"AS#1:COLOR15:PRESET(23,
37):PRINT#1,"CHOOSE A LETTER"
530 LINE(15,125)-(145,135),12,BF
550 LINE(15,135)-(145,155),4,B
570 PRESET(30,127):PRINT#1,"LETTERS U
SED"
590 RESTORE1090
610 FORG=1TOWO:READA$:NEXTG
630 WD$=A$
650 FORI=1TOLEN(WD$)
670 COLOR12:PRESET(40,75):PRINT#1,STR
ING$(I,"_"):NEXT
690 H1%=5
710 X1%=2:GOSUB2310
730 X%=X%+8
750 Q=1
770 COLOR15:PRESET(X%,145):PRINT#1,B$
790 A=INSTR(Q,WD$,Q$)
810 IFA=0 AND FLAG=0THEN WR=WR+1:GOTO
970
830 IFA=0 THEN FLAG=0:GOTO710
850 PLAY"M2000V15T25507S8C":PRESET(30
+A*8+2,73):COLOR15:PRINT#1,Q$
870 SC%=SC%+1
890 IFSC%=LEN(WD$)THEN GOSUB 2490:GOT
O 1070
910 FLAG=1
930 Q=A+1
950 GOTO790
970 IF WR>0 AND WR<8 THEN PLAY"M50V15
T25507S8F"
990 IF WR=1 THEN GOSUB 1170 ELSE IF W
R=2 THEN GOSUB1270 ELSE IF WR=3 THEN
GOSUB1370 ELSE IF WR=4 THEN GOSUB1570
 ELSE IF WR=5THEN GOSUB1770 ELSE IF W
R=6THEN GOSUB1830 ELSE IF WR=7 THEN G
OSUB1890
1010 IF WR=8 THEN 1050
1030 GOTO710
1050 FORZ=1TO500:NEXT:PRESET(10,160):
PRINT#1,"THE WORD WAS ";WD$ :GOSUB 21
10
1070 END
1090 DATATIGER,ANTELOPE,ELEPHANT,COBR
A,SEAL,LEOPARD,HOUSE,FAMILY,BUNGALOW,
VEGETABLE,POTATOE,PARSNIP,TELEVISION,
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R,RECORDER,LITERATURE
1110 DATAKEYBOARD,PROGRAM,CARTRIDGE,C
ASSETTE,PORPOISE,DOLPHIN,FOX,RABBIT,T
ERRIER,KITTEN
1130 DATASTEREO,VIDEO,SPRITE,ZEBRA,GI
RAFFE,FLAMINGO,EAGLE,MONKEY,BISON,FAL
CON
1150 DATAVARIABLE,ERROR,JOYSTICK,TAPE
,CHEETAH,SALMON,FILE,SPECIFICATION,BA
DGER,POLECAT
1170 PUT SPRITE3,(SX%,SY%),9,3
1190 PUT SPRITE2,(SX%,SY%),4,2
1210 DRAW"BM205,51;C9D9R9U9L9"
1230 PAINT(210,55),9
1250 RETURN
1270 DRAW"BM190,60;C6R40D60L40U60"
1290 PAINT(210,90),6
1310 DRAW"BM190,100;C10D5R12D3R16U3R1
2U5L12U3L16D3L12"
1330 PAINT(200,102),10
1350 RETURN
1370 DRAW"BM190,70;C6U10L10G7D45R10U3
5R10"
1390 PAINT(180,90),6
1410 DRAW"BM174,110;C11R8D7L8U7"
1430 PAINT(180,112),11
1450 FORX=1TO4:PSET(174,116+X),9:NEXT
1470 FORX=1TO8:PSET(176,116+X),9:NEXT
1490 FORX=1TO12:PSET(178,116+X),9:NEX
T
1510 FORX=1TO8:PSET(180,116+X),9:NEXT
1530 FORX=1TO4:PSET(182,116+X),9:NEXT
1550 RETURN
1570 DRAW"BM230,70;C6U10R10F7D45L10U3
5L10"
1590 PAINT(245,80),6
1610 DRAW"BM238,112;C11R8D7L8U7"
1630 PAINT(240,115),11
1650 FORX=1TO4:PSET(238,117+X),9:NEXT
1670 FORX=1TO8:PSET(240,117+X),9:NEXT
1690 FORX=1TO12:PSET(242,117+X),9:NEX
T
1710 FORX=1TO8:PSET(244,117+X),9:NEXT
```

```
1730 FORX=1TO4:PSET(246,117+X),9:NEXT
1750 RETURN
1770 DRAW"BM190,120;C10D60R13U60L13"
1790 PAINT(200,130),10
1810 RETURN
1830 DRAW"BM230,120;C10D60L13U60R13"
1850 PAINT(225,130),10
1870 RETURN
1890 DRAW"BM190,180;C4R13D10L20U10R7"
1910 PAINT(195,185),4
1930 DRAW"BM224,180;C4R13D10L20U10R7"
1950 PAINT(228,185),4
1970 IF WR<7 THEN RETURN
1990 IF WR=7 AND SC%=LEN(WD$)THEN 209
0
2010 FORS=1TO2
2030 PRESET(15,100):PRINT#1,"ONE MORE
 MISTAKE":PRESET(15,110):PRINT#1,"AND
 YOU HANG!!!"
2050 PLAY"T150V12O4L16CDD#EF#FGF#FED#
DC#CD#DC#C":NEXT
2070 FORS=1TO1000:NEXT:PRESET(15,100)
:COLOR1:PRINT#1,"ONE MORE MISTAKE":PR
ESET(15,110):PRINT#1,"AND YOU HANG!!!
"
2090 COLOR15:RETURN
2110 REM head
2130 PLAY"v15t80o3l8cr64l8cl64r64cl64
cr64l4ct50l8d#l16dl8dl32cl8co2l16bo3l
4c"
2150 FOR SY%=20TO192
2170 PUT SPRITE3,(SX%,SY%),4,3
2190 PUTSPRITE2,(SX%,SY%),6,2
2210 FORZ=1TO10:NEXT:NEXT
2230 PRESET(10,185):PRINT#1,"RETURN T
O PLAY AGAIN"
2250 X$=INKEY$:IFX$=""THEN2250
2270 IF ASC(X$)=13 THEN RUN ELSE END
2290 RETURN
2310 H1%=H1%+X1%:IF H1%<50RH1%>195 TH
EN X1%=-X1%
2330 PUT SPRITE0,(H1%,8),13,1
2350 B$=INKEY$
2370 IFB$=""THEN2310
2390 IFASC(B$) <65 OR ASC(B$)>90 THEN
 BEEP:FORX=1TO15:COLOR15:PRESET(15,10
0):PRINT#1,"ENTER CAPS LOCK!!!":PLAY"
M50V12T255O7S8F":NEXTX: COLOR1:PRESET
(15,100):PRINT#1,"ENTER CAPS LOCK!!!"
:COLOR15:GOTO2310
2410 Z=INSTR(1,DD$,B$):IF Z<>0 THEN B
EEP:FORX=1TO15:PRESET(10,100):PRINT#1
,"LETTER ALREADY USED!":PLAY"M50V10T2
55O7S8F":NEXTX:COLOR1:PRESET(10,100):
PRINT#1,"LETTER ALREADY USED!":COLOR1
:GOTO2310
2430 Q$=B$
2450 DD$=DD$+B$
2470 RETURN
2490 REM
2510 H2%= 180
2530 LINE(200,0)-(255,50),1,BF
2550 LINE(150,50)-(255,191),1,BF
2570 PLAY"M1100V15T255O7S12CEFGFEC","
M1100V15T255O3S8CEFGFEC"
2590 PLAY"M1100V15T255O7S12CEFGFEC","
M1100V15T255O3S8CEFGFEC"
2610 GOSUB1170:GOSUB1270:GOSUB1770:GO
SUB1830:GOSUB1890
2630 DRAW"bm190,77;c6l15h7u50r10d40r1
5"
2650 PAINT(170,70),6
2670 DRAW"bm169,20;c11r8d7l8u7"
2690 PAINT(173,23),11
2710 FORX=1TO4:PSET(169,20-X),9:NEXT
2730 FORX=1TO8:PSET(171,20-X),9:NEXT
2750 FORX=1TO12:PSET(173,20-X),9:NEXT
2770 FORX=1TO8:PSET(175,20-X),9:NEXT
2790 FORX=1TO4:PSET(177,20-X),9:NEXT
2810 DRAW"BM230,77;C6r15e7u50L10d40L1
5"
2830 PAINT(240,65),6
2850 DRAW"BM243,20;C11R8D7L8U7"
2870 PAINT(246,24),11
2890 FORX=1TO4:PSET(243,20-X),9:NEXT
2910 FORX=1TO8:PSET(245,20-X),9:NEXT
2930 FORX=1TO12:PSET(247,20-X),9:NEXT
2950 FORX=1TO8:PSET(249,20-X),9:NEXT
2970 FORX=1TO4:PSET(251,20-X),9:NEXT
2990 FORZ=1TO1000:NEXT
3010 PRESET(10,185):PRINT#1," RETURN
TO PLAY AGAIN"
3030 PUT SPRITE0,(H2%,0),13,1
3050 H2%=H2%+X1%
3070 IFH2%<170ORH2%>220THENX1%=-X1%
3090 X$=INKEY$:IF X$="" THEN 3030
3110 IF ASC(X$)=13 THEN RUN ELSE END
3130 H2%=H2%+X1%:GOTO3030
3150 RETURN
3170 DRAW"BM7,0;S8C4D10R2U4R3D4R2U10L
2D4L3U4L2;BR14;S16C2R3D5LU2LD2LU5BFRD
LUBH;BR6BU1;C11F3U3RD5H3D3LU5;BR8;S8C
4D10R8U3R1U1L4D1R1D1L4U6R5U2L7;BR14;S
8C8R2F2E2R2D10L2U8G2H2D8L2U10;BR15;S1
6C2R3D5U5D5LU2LD2LU5BFRDLUBH;BR6U1;C1
1F3U3RD5H3D3LU5"
3190 PAINT(9,1),4:PAINT(37,2),2:PAINT
(65,3),11:PAINT(97,3),4:PAINT(127,3),
8:PAINT(157,3),2:PAINT(182,9),11
3210 RETURN
```

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We have to insist on tape or 3½inch disk copies, as we haven't the time to type in programs ourselves.

Your covering letter should include instructions on how to use or play the program, as well as a brief description of any interesting programming techniques.

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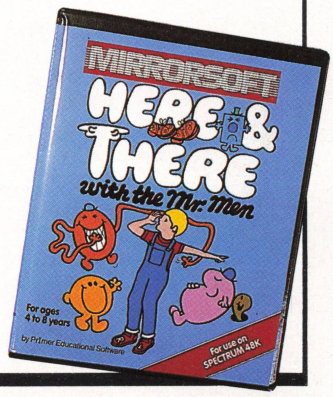

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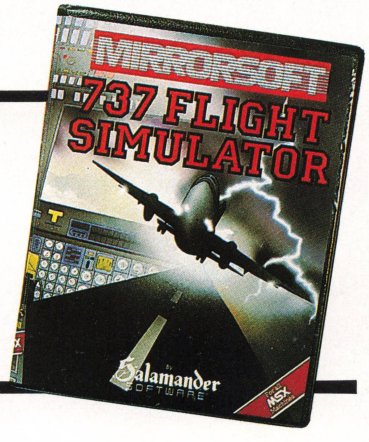

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